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LEADERS OF MEDICINE

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BY
DR. SOLOMON R. KAGAN



HYGIENE AND HEALTH
RESEARCHES IN HEBREW LITERATURE
JEWISH CONTRIBUTIONS TO MEDICINE
IN AMERICA
LIFE AND LETTERS OF
FIELDING H. GARRISON

LEADERS OF MEDICINE

Biographical Sketches of Outstanding
American and European Physicians

BY

SOLOMON R. KAGAN, M. D.



THE MEDICO-HISTORICAL PRESS

BOSTON, MASSACHUSETTS

MCMXLI

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BOSTON, MASSACHUSETTS

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FOREWORD

THE study of medical history is both of interest and value. The medical historian not only reproduces past with fidelity and exactitude, but he also shows the background of discoveries and advancement, and coordinates the medical sciences. The achievements of the past become the stepping stones to future progress.

It is noteworthy that medico-historical literature in the United States runs a parallel course with the advancement of medical sciences. Leaders like Osler, Jacobi, Welch, Garrison, Walsh and Cushing not only made lasting contributions to medicine, but also stimulated a powerful interest in the history of medicine.

The present volume was written by me under the inspiration of the late Colonel Fielding H. Garrison, and he suggested the title *Leaders of Medicine* for this work.

I wish to express my gratitude to Prof. James J. Walsh, Prof. Joseph McFarland, Prof. Lewellys F. Barker, Prof. Victor Robinson, Prof. Myer Solis-Cohen, Col. Harold W. Jones, librarian of the Army Medical Library, Washington, D. C., and Dr. Esther Rosencrantz of San Francisco, for presenting me with letters of S. Weir Mitchell, Abraham Jacobi, Sir William Osler, John S. Billings, Samuel D. Gross, Sir Clifford Allbutt, and William H. Welch, for reproduction in this volume. I am grateful also to Sir Humphry Rolleston of England, Prof. Hyman Morrison of Boston, and Mr. William White of Hermosa Beach, California, for valuable suggestions, and to Miss Anne M. Marlatt, assistant editor of the *Medical Record*, for some bibliographical data.

SOLOMON R. KAGAN

1101033

Boston,
Massachusetts

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CHAPTER I

DR. JACOB HENLE

(1809-1885)

Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time.

— H. W. LONGFELLOW

Dr. Jacob Henle was the greatest histologist of his time and one of the greatest anatomists of all times. As a founder of modern medicine, as a foremost investigator, teacher, editor and author, he accomplished much in the fields of comparative anatomy, human anatomy, histology, and pathology.

He was born at Fürth, near Nuremberg, on July 19, 1809, the son of Jewish parents, who were intelligent and efficient, and influenced their son's character and education. He was a Baiersdorf rabbi's grandson but never learned the fundamentals of Judaism. In one of his letters to his parents Henle mentioned a passage from the Bible, stating that he acted like Abraham in reference to his friend Froriep. In 1815 the Henle family moved to Mainz, where in 1821 they renounced Judaism and became evangelists. Henle's father wanted to secure safety and wealth for his family, and his mother, a rabbi's daughter, lacked virtue to follow the steps of her great father. Among Henle's tutors in Mainz was Hugier, who laid the foundation of his excellent French. Henle studied violin under Kreuser and showed great skill in music. From his father he inherited a marvelous intellect and zeal for scientific pursuits and a musical talent, and from his mother — persistence and self-confidence. Dr. George Rosen remarks that Henle in his early life came in contact with the contemporary revolutionary currents, both political and scientific, and these movements influenced Henle to become a reformer and an exponent of new ideas in medicine.

Henle's full name was Friedrich Gustave Jacob Henle, but he



PROFESSOR JACOB HENLE

(1809-1885)

[Courtesy of Professor Henry E. Sigerist, editor,
Bulletin of the History of Medicine, Baltimore]

was known as Jacob Henle. His father, Wilhelm, was a successful merchant who was interested in music and arts. His mother, Helen, was a devoted parent who was able to overcome her son's passion for noise and boyish tricks, and to develop his native intellectual powers. He had four sisters: Marie, Rosalie, Johanne, and Helene. They were both musical and highly intellectual women. He had two sons, Carl and Adolf, and four daughters: Elise, Anna, Sophie, and Emma. Henle's younger son, Dr. Adolf R. Henle, became a great surgeon, and published original work on tuberculous abscess (1897) and on injuries and diseases of the spinal cord (1902). Henle's daughter, Anna, was married to her father's pupil, Friedrich Merkel, who succeeded his father-in-law as professor of anatomy at Göttingen. Henle's youngest daughter, Emma, was married to Franz Rühl, professor of history in Königsberg. Henle's eminent grandchild is Prof. Alfred Rühl of Charlottenburg. Among Henle's ancestors was Elkan Henle (1761-1833) a prominent author and one of the earliest champions of the emancipation of the Jews in Bavaria. Among his well-known relatives was Sigmund von Henle (1821-1901), a Bavarian deputy who was highly esteemed by King Ludwig II.¹

While residing in Mainz he developed a periostitis, and Professor Leydig operated on him. He recovered and left his bed, but recurrent attacks of periostitis caused Henle trouble at intervals throughout his life. In 1824 the family Henle, on account of business considerations, moved to Coblenz which became their permanent residence. There the young Henle became acquainted with Johannes Müller, and at his suggestion he chose medicine as his life work.

In 1827 Henle matriculated at the University of Bonn. There, under the influence of Professor Müller, who was a pioneer in anatomy and physiology, he began to think from the first anatomically and physiologically. In his second semester at Bonn he illustrated Müller's book on glands and worked in his laboratory. He then became interested in anatomy and wrote to his parents: "I know of no better food for the imagination than the beautiful formation of the human body, constructed of individual bones and muscles, which I know so well and can assemble accurately." In the same year he

1) See F. T. Haneman, M. Kayserling, and F. Perles: *Jewish Encyclopedia*, New York and London, 1916, VI, 345-347; I. Fischer: *Biographisches Lexikon*, Berlin-Vienna, 1932, I, 66.

joined the *Burschenschaft* at the university, a student society with democratic principles, and took part in its political activities. In 1830 he left Bonn for Heidelberg where he was delighted with his teachers Naegele, Chelius, Puchelt, Arnold, and Tiedemann. In 1832 Henle was graduated in medicine from the University of Bonn. An examiner who read Henle's graduating papers said that during his lifetime he had not seen their equal. Müller was so impressed that he invited Henle to accompany him on his visit to Paris to make studies in comparative anatomy.

In 1834 Müller became professor of anatomy and physiology at the University of Berlin, and he appointed Henle as prosector at the anatomical museum. Henle chose an academic career partly under Müller's influence and partly because of his interest in scientific research. In 1835 he applied for formal habilitation as *privat docent*, but soon he was imprisoned for six weeks on account of his past participation in the Bonn *Burschenschaft*. Later in January 1837 he was sentenced as an *ex-Burschschafter* to deprivation of state office and six years incarceration in a forest. Due to the efforts of influential men, particularly of Alexander von Humboldt, Henle was pardoned in March of the same year. During the six years he worked in Berlin (1834-40) Henle published original work on anatomy and histology which won for him an international reputation as a pioneer in anatomy. He became a frequent contributor to Müller's *Archiv* and medical dictionaries and encyclopedias.

In 1840 Henle accepted a call to the University of Zurich, Switzerland, where he became professor of anatomy and physiology. There he founded the school of rational medicine, and in collaboration with Pfeufer he edited the *Journal of Rational Medicine* (1842-69) which greatly influenced modern thought. From 1844 to 1852 he occupied the chair of anatomy at Heidelberg. There the government of Baden conferred the distinction of *Hofrat* upon him. On this occasion he wrote to his father that the student's serenade given to him in Halle gave him more pleasure than the so-called favor of the lordships. From 1852 until his death he was professor of anatomy at the University of Göttingen.

While Henle was a student in Bonn he was very active in his academic life and in student organizations. He was a social success, and his student life was a stormy one. As a typical German student he engaged in a duel with another student and was wounded, which left

for life a small sword-cut upon his left cheek. He frequently visited Professor Müller's home, relishing the scientific talk with his master and the duets with his teacher's wife. He was also a frequent visitor of the theatre and attended affairs of social interest. He was a great lover of music and arts. Even when he served as professor at Zurich he found time for music, and for some time he belonged to a theatrical company and participated in public performances. In his early life in Göttingen he organized there musical and theatrical circles, and his home became a center for artists.

In 1858 when Müller died, Berlin invited Henle to occupy Müller's chair, but he declined the high position, preferring to remain in the comparatively small town of Göttingen. He found satisfaction and recreation in research, and in music and literary circles. He devoted his time and attention also to his family, cultivated his garden, and bought a house. At the same time he worked vigorously on his classical book, *The Handbook of Systematic Anatomy*.

Henle was a highly gifted and cultivated man of letters and art. He was a brilliant investigator, a vivid lecturer, a man with encyclopedic knowledge, a searcher for truth and perfection. His work bears the mark of his genius. He had other interests in life besides science. He was an excellent player on the violin and violoncello, a pleasant singer, an expert dancer, and a skilful horseback rider. A poet, a romantic by nature, love was to him a life necessity. He had an impressive personality, was peripatetic, active, reticent, introspective, and full of ambition.

Henle was modest and avoided praise for his important contributions to medicine. In 1837 he wrote to his father that a Jewish student named Maier of Stralsund showed him a letter from his father in the Hebrew language which contained a poem about Henle; each verse beginning with a letter of his name (this is a characteristic feature of the ancient Hebrew poetry). On Henle's suggestion the student started to translate the content into German. But when Henle heard the first line which read: "Who am I to dare to step forward before a man whose fame penetrates the world," Henle begged him to spare him.²

It is noteworthy that Henle, who was the greatest anatomist of

2) See V. Robinson: *Pathfinders in Medicine*, N. Y., 1929, 502-503.

his time, failed on the examination of this subject to get a mark "excellent." In connection with this, it is of interest to quote an excerpt from his letter to his father, dated March 3, 1833. "Everything proceeded brilliantly, but the worm which was to destroy my beautiful blossom crawled into it in the person of Professor Schlemm, who examined me in anatomy. This rascal and black hypocrite, paid me the greatest compliment to my face and behind my back wrote 'good,' and although in all other branches I had partly 'very good,' partly 'excellent' as I expected, still this could not save me, as he who has but one 'good' is excluded from the first grade . . . I consider his judgment, especially in view of his verbal opinion, the first and surely not the last step I shall have the experience of professional jealousy."³

Henle was a man of kindness and modest manners and had a great number of friends, among the greatest of science, literature and art, such as Müller, Pfeufer, Haller, Schwann, Schöenlein, Kussmaul, Weber, Woehler, Schoell, Kölliker, Friedlander, Waldeyer, Auerbach, Felix Mendelssohn, Humboldt, and Gustav Magnus. Henle was a very devoted friend. While he came to Berlin after graduating he had a chance to get a position in the academy of art, but did not want to apply for it because his friend Froriep might apply for the same position. When Henle was called to Tübingen's chair he declined the offer because he did not want to be separated from his friend Pfeufer in Zurich, whose bust he kept on his desk. Henle showed much affection for Müller and Waldeyer. Henle was much beloved and highly revered as a teacher. He was an entertaining and informative lecturer. "Henle's lecture was like a fresh, clear brook, upon whose lightly-stirring surface merry lights were playing" (Kussmaul). He was calm and used humorous comparisons and unexpected flashes of thought and brilliant wit. His students admired and respected him. He also lectured in Heidelberg on anthropology, and his lectures attracted great audiences including many great men of various branches of science, such as the historian Gervinus.

Henle was a man of rightness and dignity. When Tiedemann, who called him to Heidelberg, gave the order for the furnishing of the interior of the new Anatomical Institute in Heidelberg, Henle criticized his plans, considering them unserviceable. The authoritative architects agreed with Henle. But the angered Tiedemann shouted

3) V. Robinson: *Pathfinders in Medicine*, 1929, 497-498.

that his young colleague was a shameless Jew. Henle resigned, but Heidelberg did not let him go. The ministry rebuked Tiedemann for his wrong action and demanded that he apologize in writing. Some members of the faculty, Pfeufer, Gervinus, Vangerow and Jolly decided that Henle's honor has been sufficiently vindicated and induced him to remain.

There is a coincidental resemblance in the life of Henle and Abraham Jacobi. Both were born in a small town in Germany and were of Jewish extraction, Henle's father being a merchant and Jacobi's a poor shopkeeper. Both had some common teachers, friends and ideas of freedom and brotherhood, and both were active in the students' progressive work. Both were graduates of the University of Bonn. When Henle applied for rehabilitation as an instructor at the University of Berlin he was imprisoned for his former work in the *Burschenschaft*. When Jacobi, too, sixteen years later applied in Berlin for the state examination he was recognized as a "Forty-eighter," as one of the youths who worked for a new era of universal brotherhood and was sentenced to prison. Henle was liberated by Humboldt while Jacobi was freed by the jailer who suggested that he escape immediately to avoid rearrest on new charges. Henle while professor at Heidelberg contemplated emigration to America, but family circumstances interfered; Jacobi left Germany for the United States. Both became leaders of medicine and won international fame. Henle was invited to Berlin as Müller's successor, but he declined to go to Prussia; Jacobi, too, was called to Berlin as Henoch's successor but he rejected Prussia's offer, and remained in New York City. Both started their careers in prison and ended with a *Festschrift* and Jubilee.

In recognition of his great achievements Henle was honored by his pupils, associates and friends, scientific institutions, and the government. His pupils had great affection for their outstanding mentor and called him "Old Jacob." When he visited Halle the students arranged a triumphal meeting to express their high esteem for this great teacher. The University of Breslau conferred upon him a philosophical degree, the University of Edinburgh an LL.D. degree, and the Baden government — a distinction of *Hofrat*, the Prussian government — *Geh. Ober-Medicinalrat* and *hohe Orden*, Göttingen selected him permanent secretary of the *Kgl. Gesellschaft und Wissenschaft*. In 1882 Henle's fiftieth anniversary of his graduation was impressively celebrated by German scientists. The mayor delivered the

town's greetings, and the students presented their master with a golden laurel wreath. His former pupil, Professor A. Kölliker, said in his address that Henle's work would remain for all times a paragon of scientific literature, and that Henle had raised the "anatomical sciences to an unprecedented degree of perfection, which must serve as a foundation for all future builders." The *Festschrift*, the University of Göttingen's commission for a bust of Henle to stand in their anatomical building, and the numerous decorations from various states marked the great significance of this jubilee.

Henle's life reads like a romance. His son-in-law, F. S. Merkel, has presented a classical biography of this great investigator, pioneer, and teacher. The story of Henle's marriage is full of dramatic episodes.⁴ Adolf Kussmaul tells that Henle married a charming girl from the lower classes, Miss Elise Egloff, but he had a sister educate her in accordance with the social tone of the time. He tells also that a Heidelberg teacher of anatomy, a pupil of Henle, wished to follow his adored master, not only in research work, but also in the choice of a wife. He made a proposal of marriage to a waitress, who appealed to him, with the understanding that she should first be educated in a private school at his expense so as to be fit for his high position in society. But she flared up and angrily told him that she already had a sweetheart for whom she was educated enough, a trim butcher who outweighed two such lean doctors.⁵

Henle's contributions to medical science are of an epoch-advance in medicine. His histological discoveries "take rank with the anatomical discoveries of Vesalius" (Garrison). His work may be divided in four periods: The Berlin period (1834-40), the Zurich period (1840-44), the Heidelberg period (1844-52), and the Göttingen period (1852-85). He suggested a new method of approach to the phenomena of health and disease, calling it "rational," which term stands between the philosophical romantic medicine on the one hand and empiricism on the other. His method "was not concerned with the description of symptoms or the construction of intricate metaphysical theories of

4) See V. Robinson: *The Life of Jacob Henle*, New York, 1921, 21-23, 38, 60-70, 75-76.

5) A. Kussmaul: *Jugenderinnerungen eines alten Arztes*, Stuttgart, 1931.

disease but rather with the relation of symptoms to the lesions of the internal organs."⁶

Henle's first contribution to medicine was his dissertation essay in 1832 which dealt with the embryology of the eye. It was a scientific contribution that forecast a future discoverer. Later he continued to contribute work on the organ of vision. He investigated the histology and anatomy of the retina and cornea, the physiology of the lachrymal canal, the fibres of the crystalline lens, and the construction and development of the lens. As a result of his extensive research we have many eponyms. His name is found on the following muscles, vessels, bones and viscera of the human body: trachoma glands of Henle, Henle's membrane (the lamina busalis), Henle's fibrous layer, Henle's stratum nerveum, Henle's warts, Henle's layer (of the hair follicle), Henle's spine, Henle's fissures, Henle's ligament, Henle's fenestrated membrane, Henle's ampula, the canal of Henle (the portion of the uriniferous tubule), Henle's cells, Henle's fibrin, Henle's internal cremaster, Henle's sphincter, and Henle's loop which he discovered by injection.

Among Henle's early research works are his studies in collaboration with Müller on the plagiostoma (1838-41), the electric fish *Narcine* and the annelid *Enchytraeus*. Of particular interest was his monograph on the larynx in which he traced the development of the organ of the voice. Henle was the founder of modern knowledge of the epithelial tissues of the body (1836-37), described pavement and cylinder epithelium, was the first to define columnar and ciliated epithelium, and was the first to describe the stratum mucosum of the epidermis and the intestinal epithelia. He stated that all free surfaces of the body and inner surface of its tubes and canals and cavities are lined with epithelium. He proved that the cells in the superficial layers of epithelium are much more expanded than those in the deeper strata and that they are non-vascular. He showed that vibratile cilia stand upon little cylinders which are merely a modification of the epithelium. He demonstrated that the rete malpighii consists of round nucleated cells and discovered in the intestinal mucous membrane cells which are prolonged into cylinders. He (simultaneously with Purkinje) described the structure of hepatic cells. Walther Flemming

6) G. Rosen: "Social Aspects of Jacob Henle's Medical Thought," *Bull. Inst. Hist. Med.*, 1937, V, 532.

wrote that Henle made the most important references to the cellular construction of animal tissue.⁷ Henle paved the way for the cell-theory of Schleiden and Schwann. He showed the presence of smooth muscles in the middle coat of the smaller arteries, a discovery which laid the foundation of the theory of vasomotor mechanism. He also discovered the external sphincter of the bladder, the internal root-sheath of the hair, the central chylous vessels, the Henle tubules in the kidney (1862), simplified the classification of tissues, improved the medical nomenclature, first described the relationship of the hippocampus and the posterior lobe of the pituitary body, and presented the first logical account of the axes and planes of the body.⁸

In 1840, during his last year in Berlin, his work, *Pathological Researches*, appeared. In this book he presented a rational explanation of fevers. In the same book was included his classical essay, "Miasms and Contagia," which laid the foundation of the germ-theory of infectious diseases. Henle said that living organisms are the cause of infectious and contagious diseases, but that they are invisible because they differ very little from the tissue in which they are imbedded. His statement was based on observation, not experimentation. It was his pupil Koch who, thirty-two years later, proved Henle's theory by introducing his method of fixing and staining bacterial films to discover the tubercle bacillus. Henle formed the basis for the science of bacteriology, and when the stain technic was introduced in bacteriology, he was hailed as a prophet. In the same book was included Henle's explanation of metastasis in neoplastic disease which shows that he foresaw the cellular pathology eighteen years before Virchow pronounced it. Pagel states that Robert Koch was influenced in his epoch making discoveries by Henle.⁹ Garrison remarks that Koch's statement in 1882 established the pathogenic character of a given micro-organism, which had already been adumbrated by Henle and Edwin Klebs.¹⁰ Dr. Victor Robinson points out that Henle laid the foundation of the germ-theory of disease.¹¹ Dr. George Rosen says that Henle gave a hint of the Virchow's cellular pathology, and that Koch

7) Quoted by V. Robinson, in his *Life of Jacob Henle*, 1921, 108-109.

8) F. H. Garrison: *History of Medicine*, Phila., 1922, 483-484.

9) J. Pagel: *Biog. Lexikon*, Berlin, 1901, 715-719.

10) F. H. Garrison: *History of Medicine*, Phila., 1922, 623-624.

11) See V. Robinson: *The Life of Jacob Henle*, New York, 1921, 106-107, 116.

in later life admitted how deeply he was grateful to his teacher Henle who had aroused his sense of investigation.¹²

In 1841, while Henle was residing in Zurich, his great work, *General Anatomy*, of which Kussmaul wrote that a new world was opened up by it, was published. In this book he considered the developmental, functional and structural relations of the tissues, which was an advance upon Bichat's work. In the same year he discovered the demodex folliculorum. In the Zurich period he also wrote on the ubiquitous pimple-mite, gregarines, and the parasites of invertebrates. In 1844 he collaborated with Kölliker on the Pacinian bodies. Henle first demonstrated the significance of urinary casts in renal disease and discovered unstriated muscles in blood vessels walls. He investigated hypertrophy and tumors through checked resorption and explained the relationship between the blood and lymph streams. He studied the tonus, cramp and paralysis of the bronchi and expectoration, and described the physiology and pathology of breathing. He demonstrated the contractility of the bronchi through the action of the smooth musculature.

During the Heidelberg period Henle completed his main contribution to pathology, *Handbook of Rational Pathology* (1846-53), which was of an epochal importance. In addition to this work Henle's many scientific papers were published in the *Journal of Rational Medicine*, including his studies of cylindroma-siphonoma, a new genus of tumor (1845), absorption of narcotics through the lymphatics (1846) and Hassall's corpuscles (1849).

During his period in Göttingen he produced his monumental work, *Handbook of Systematic Anatomy* (1855-71) which was followed by an *Atlas* (1874-77). The excellent illustrations were drawn by himself. This monumental work presented a complete re-examination of the human body. He said then humorously that now that this textbook is published he is compelled to teach according to Henle.

Among his numerous essays in the *Journal of Rational Medicine* are his studies of coracobrachialis muscle (1857) and of the tissue of the suprarenals and hypophysis cerebri (1865). His last publication was concerned with his favorite subject, anatomy, which even in his

12) G. Rosen: "Social Aspects of Jacob Henle's Medical Thoughts," *Bull. Inst. Hist. Med.*, 1937, V, 528-529; *Idem.*, "Jacob Henle: On Miasmata and Contagia," *Bull. Inst. Hist. Med.*, 1938, VI, 909.

youth he preferred to other scientific subjects. It was a monograph on the growth of the human nail and the horsehoof which was published in 1884.

Professor Wilhelm Waldeyer, a pupil of Henle, stated that, as an investigator, Henle enriched medical science with numerous important discoveries. Even when he made an erroneous statement it usually served as a source of stimulation and clarification, and the subsequent discovery of the truth.¹³

Apart from his editorship of Henle and Pfeufer's *Journal of Rational Medicine* Henle was the annual reviewer of medical progress of physiology, pathology, pathological anatomy, histology, and general and special anatomy. These yearly reports were "a literary creation which ranks exceptionally high, and is practically the only one of its kind" (Leyden).

He died at Göttingen on May 13, 1885, at the age of seventy-six. Henle paved the way for the development of new scientific methods and views in various branches of medicine. His influence was effective not only through his publications and editorship but also through his lectures for a period of forty-one years. He was an eloquent academic teacher who inspired his pupils and stimulated research work by his clear presentation, soundness of thought, and wide vision. He created Henle's school and was Germany's greatest anatomist.

Henle's studies of the physiological activity of tissues on the basis of their anatomical structure, his idea that physiology is the foundation of pathology, his statement that living organisms are the cause of infectious and contagious diseases, and his achievements in the field of human anatomy served as a foundation for the research workers and medical builders. His work is an indestructible monument of his fruitful and lasting contributions to modern medicine.

Among Henle's publications are: *Pathologische Untersuchungen*, Berlin, 1840; *Allgemeine Anatomie*, Leipzig, 1841; *A Treatise on General Pathology* (translated from the German by H. C. Preston) Phila., 1853; *Zur Anatomie der Niere*, Göttingen, 1862; *Handbuch der rationalen Pathologie*, Braunschweig, 1871; *Handbuch der Nervenlehre des Menschen*, 1871; *Anthropologisches Fortraege*, 1880; *Grundriss der Anatomie des Menschen*, Bonn, 1880; and *Theodor Schwann*, Bonn, 1882.

13) W. Waldeyer: "Jacob Henle," Hirsch's *Biog. Lexikon*, Berlin-Wien, III, 162-165.

The main sources of information are: F. Merkel, *Jacob Henle*, Göttingen, 1886; A. Kussmaul, *Jugenderinnerungen eines alten Arztes*, Stuttgart, 1931; J. Pagel, *Biog. Lexikon*, Urban & Schwarzenberg, Berlin-Vienna, 1901, 715-719; K. Bardeleben, *Deutsche med. Wchnschr.*, Berlin, 1885, XI, 463, 483; W. Flemming, *Biol. Centralbl.*, Erlangen, 1885-86, V, 289-293; W. Waldeyer, *Arch. f. mikr. Anat.*, Bonn, 1885-86, XXVI, pp. i-xxxii; *idem.*, in A. Hirsch's *Biog. Lexikon*, Berlin & Vienna, 1931, III, 162-165; V. Robinson, *Life of Jacob Henle*, New York, 1921; F. H. Garrison, *History of Medicine*, Philadelphia, 1922, 483-485; G. Rosen, "Social Aspects of Jacob Henle's Medical Thoughts," *Bull. Inst. Hist. Med.*, 1937, V, 509-537; *idem.*, "Jacob Henle: On Miasmata and Contagia," *Bull. Inst. Hist. Med.*, 1938, VI, 907-983; E. Ebstein, *Aerzte-Memoiren*, Berlin, Julius Springer Publ., 1923, 292, 309-310; *Medical World*, edited by Anton Mansch, Berlin-Charlottenburg; *Vossische Zeitung*, 1885, No. 224; *Deutsche Med. Wchnschr.*, 1885, No. 27; and W. Haberling, "From the Life of Jacob Henle," *Medical Life*, N. Y. (Oct.) 1929, XXXVI, 501-507.

CHAPTER II

DR. RUDOLF VIRCHOW

(1821-1902)

A great man is one who affects the
mind of his generation.

— LORD BEACONSFIELD

Dr. Rudolf Virchow, "the father of modern pathology," was born on October 13, 1821, at Schivelbein in Pomerania. He was a pupil of the great Johannes Müller, and was graduated in 1843 from the Berlin Medical Faculty. In 1845 he was appointed prosector at the Charité Hospital. In 1847 in collaboration with Reinhard he founded the *Archiv für pathologische Anatomie und Physiologie*, commonly known as *Virchow's Archiv*. In his first paper in this periodical he laid the keynote of the modern spirit in scientific medicine by stating that unproved hypotheses are valueless and that no man is infallible in respect to knowledge and judgment. In 1848 the Prussian government sent him to investigate typhus fever among weavers of Upper Silesia. His report contained a brief for democracy and freedom which aroused governmental antagonism and made it necessary for him to leave Berlin. In 1849 he became professor of pathological anatomy at Würzburg. Seven years later he was recalled to Berlin, where he became professor of pathology at the University and director of the newly established Pathological Institute.

Virchow's accomplishments in medical science were of significance. His opus magnum, *Cellular Pathologie*, published in 1858, developed the idea that the body should be considered as a cell-state in which every cell is a citizen; disease is a conflict of citizens caused by certain forces; cell development is not discontinuous and there are no specific cells in disease but only certain modifications of physiologic nature (1858-67). Virchow's aphorism, "Omnis cellula e cellula," expressed the continuity of cellular life. He displaced some theories in pathology previously accepted, and originated the principle that the laws operating in disease are similar to those existing in health.

Virchow first defined leukocytosis; he (simultaneously with J. H. Bennett) described leukemia as "white blood" (1845); showed that a thrombus is the primary essential condition in phlebitis; first recognized the cerebral and pulmonary varieties of thrombosis (1846-56); discovered the specific lymphatic sheaths of the cerebral arteries (1851); found leucin and thyrosin in the pancreas after death (1853); discovered neuroglia (1854); and described the embolic nature of the arterial plugs in malignant endocarditis and attributed the cause to parasites (1856).

Among Virchow's numerous contributions are his investigations of trichinosis, his discovery of the sarcinic and aspergillic forms of mycosis in the lungs, his studies of lupus and tuberculosis, of leontiasis ossea, hematoma of the dura mater, and spina bifida occulta. Virchow coined the name "arthritis deformans" for rheumatic gout, described amyloid degeneration of the kidney, favored the multiple or polygenist theory, and introduced new pathological concepts like agenesis and ochronosis. Virchow's work in microscopical and pathological anatomy did not decrease in value even later when other leaders of medicine appeared with new conceptions of clinical observation and bacteriological achievements.

Virchow expressed his medical achievements in a letter to Dr. Abraham Jacobi, dated December 9, 1881, as follows:

"With warm feeling, I accept your glorification of me and I thank you from my innermost heart. You have appropriately emphasized what I myself consider the chief object of my work and that is that I have succeeded in securing the emancipation of pathology as an independent science. Through this a safe basis was gained for medicine in general, a basis which it is possible to enlarge and broaden but never to destroy. In this manner an end has been put to "Schools" in the old sense, and Medicine may now work and develop in all lands by the same method and with the same aim and zeal."¹

A. Jacobi in his Address concerning Virchow presented a complete idea of the immense field of advancement that Virchow had

1) See V. Robinson: "The Life of A. Jacobi," *Medical Life*, New York (June) 1928, 281.

developed. Also significant is Dr. Alfred Stillé's statement concerning Virchow:

"He is surely a transcendent genius in the fullest sense of the phrase; and to my mind his distinctive greatness is not so much in the vast range of his knowledge, and talent, as that he never is seduced by his keen insight into elaborating theories. In this respect he may be called the Newton of Medicine."²

Virchow had a fervent inclination to controversy and disputes, and was armed with a keen logic. He strongly slashed Rokitansky's theory of "crases" and "stases" (1864) although he praised Rokitansky's other work highly. He forcefully disputed with John H. Bennett about leukemia, and vigorously denied J. Cruveilhier's doctrine that phlebitis dominates the whole pathology. Virchow did not recognize Charcot's ataxic symptoms, opposed Ernst Haeckel's teaching of Darwinism and ridiculed his work, *The Riddle of the Universe*. He refuted the new views of Koch and Behring about toxins and anti-toxins, and frowned on many of the new theories in the field of bacteriology and immunology. During the war of 1870-71 after the Prussians shelled the Muséum d'histoire naturelle in Paris, Quarterfages wrote an indignant pamphlet stating that the Prussians were not a Germanic, but a barbaric, destructive Mongol race. Virchow fought this statement violently. When F. T. Frerichs came to Berlin he was at the height of his reputation and creative powers, but Virchow showed aggressive enmity to him. "So strong was Virchow's personality that even Graefe and Langenbeck lined up with him in official opposition to Frerichs, whose productiveness was soon sterilized by this professional jealousy."³ However, Virchow encouraged his pupil, Dr. Julius Cohnheim, to disprove Virchow's hypothesis of the non-migration of blood-cells, and Cohnheim proved in opposition to Virchow's teaching that the leukocytes do pass through the walls of the capillaries in inflammation. Virchow vigorously disapproved some statements of famous authors, but he himself also made gross errors. Thus he adopted the dualistic theory of tuberculosis, he stated that there can be no diapedesis of blood-cells, and he asserted that

2) *Ibid.*, 280.

3) F. H. Garrison: *History of Medicine*, Phila., 1922, 669.

the cell-contents are the controlling feature of the organism, which conclusions were later proven to be erroneous.

Virchow was a social reformer and from 1880 to 1893 was a member of the Reichstag as a faithful proponent of the rights of the people. He was a strong political opponent of Bismarck and on one occasion, in a controversy with Bismarck in the Landtag in 1865, said that the minister president's policy was indefinable, that he had no policy, not the slightest inkling of a national policy, and that he had no understanding whatever of national concerns. Another time Virchow expressed his doubts as to Bismarck's truthfulness, in consequence of which Bismarck challenged him. Virchow was indecisive, but a member of the progressive party declared that he should not fight the duel, and so Virchow sent a refusal.⁴

Virchow was also active in matters outside of scientific medicine. His interests were varied, and in all fields of social activity he showed his dynamic nature and wide vision. A. Jacobi described his work of social interests and welfare as follows:

. . . Modern anthropology had in him one of its most fruitful founders and master-builders, archeology an enthusiastic patron, the public weal of his fellow man an untiring co-worker. Thus he addressed public meetings, published, together with Holtzendorff, an endless series of popular works, sacrificed his knowledge and his working powers in the city council of Berlin, gave his best in Parliament. He was the friend of the people, the acknowledged, the most respected, and the most hated foe of his oppressors. The two volumes of his contributions to the study of epidemics have not remained mere theory; the drainage system of Berlin and the irrigated meadows are his work, the founding of schools and of military and civic hospitals and their maintenance in a sanitary condition sing his undying praise. Ecce Homo.⁵

Virchow was a man of great ability, originality, wide knowledge, and many-sided human interests. He became known as a pioneer in pathology, epidemiologist, sanitarian, teacher, editor, and social reformer. He completed the researches of pathological organs which were started by Morgagni (1682-1771) who introduced the "anatomical

4) See E. Ludwig: *Bismarck*, New York, 1927, 226-227.

5) See V. Robinson: "The Life of A. Jacobi," *Medical Life* (June) 1928, 302.

cal concept" into medicine. Virchow advanced the investigation of tissues composing the organs which were made by Bichat (1771-1802) who originated descriptive anatomy. Both Bichat and Virchow profoundly modified the medical science of their times. Virchow discovered crystalline hematoidine, first described the basic structure of the umbilical cord, distinguished between infiltration and fatty degeneration, and described leukemia with its differentiation into the lymphatic and splenic types.

Virchow's work in the field of pathology was of an epoch-making nature. He was honored both by scientific institutions and by European royalties. He paved the way for other investigators in modern medicine. The science of pathology acquired a sounder basis for further gains. Thus Virchow exerted a powerful influence upon medical thought.

Dr. Virchow died at Berlin on September 5, 1902, at the age of eighty-one. His name went down in medical history as the founder of modern pathology.

Among his works are: *Gesammelte Abhandlungen wissenschaftlicher Medicine*, Frankfurt a. M., 1856; *Cellularpathologie*, Berlin, 1858; *Die Krankhaften Geschwülste*, Berlin, 1867; *Zur Landeskunde der Troas*, Berlin, 1880; and *The Sektionstechnik*, 1892.

Sources of information are: J. Pagel's *Biog. Lex.*, Berlin and Vienna, 1901, 1774-1778; *Medical World*, Berlin and Charlottenburg; A. Hirsch. *Biog. Lex.*, 1934, 768-772; *Berlin Klin. Wchnschr.*, 1893, 1033-1056; *Deutsche med. Wchnschr.*, 1901, XXVII, 701-711; K. Sudhoff, *Rudolf Virchow und die deutscher Naturforscherversammlungen*, Leipzig, 1922; W. Becher, *Rudolf Virchow*, Berlin, 1891; K. Posner, *Rudolf Virchow, Meister der Heilkunde*, Vienna, 1921; W. Ebstein, *Rudolf Virchow als Arzt*, Stuttgart, 1903; F. H. Garrison, "Rudolf Virchow," *Ann. Med. Hist.*, 1923, V, 186; *idem.*, *History of Medicine*, Phila., 1922, 612-616; *Bibliographie*, Berlin, 1901; F. Boas, *Science*, 1902, n. s., XV, 441-445; W. H. Welch, *Phila. Med. J.* 1902, X, 360; Wm. Osler, *Johns Hopkins Univ. Circ.*, Balt., 1891, XI, 17-19; W. Waldeyer, *Abhandl. d. k. preuss. Akad. d. Wissensch.*, Berlin, 1903, 1-53; and F. von Recklinghausen, *Arch. f. path. Anat.*, Berlin, 1903, CXXI, 2-7.

CHAPTER III

DR. SILAS WEIR MITCHELL

(1829-1914)

Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life.

— MARCUS AURELIUS

One of the remarkable leaders of American medicine, a colorful personality, a scholar, investigator, novelist, and story-teller, was Dr. S. Weir Mitchell.

Mitchell was born in Philadelphia on February 15, 1829, the son of Dr. John K. Mitchell. Coming from a long line of physicians imbued from boyhood with the atmosphere of medicine, it was but natural that Mitchell should follow the tradition. His early education he received, first at Enoch Wines' School, then at the grammar school under the Rev. Crawford. In 1850 he was graduated from Jefferson Medical College. One year of postgraduate work in Paris under the physiologist Professor Claude Bernard and the master of microscopy Professor Robin and contacts with other great masters, gave him a foundation in scientific medicine, especially in physiology and microscopy.

MITCHELL AS A SCIENTIST AND INVESTIGATOR

While his father attempted to make a surgeon of him, Mitchell devoted himself to physiology and bacteriology. Later he turned to a different specialty, neurology and psychiatry. This change is in accordance with his congenital inclination to psychology and its allied branches.

In 1862 Mitchell got an appointment at the Filbert Street Hospital where he became interested in cases of nervous diseases and wounds of nerves, a subject about which little was then known. His extensive work in the field of neurology attracted the attention of the

Surgeon General who created first a small hospital for nervous diseases and later, the Turner's Lane Hospital, in Philadelphia, in 1862. In this hospital where Drs. Alden, Morehouse, Keen, Mitchell and DaCosta worked, massage was first applied to restore action to limbs for palsied muscles or for rigidity in splinted cases. At the same institution atropine was first employed hypodermically for the relief of muscular spasms. Mitchell's work in collaboration with his associates revolutionized knowledge in reference to wounds of nerves.

Mitchell was one of the greatest American neurologists of his generation. He did pioneer work in the field of neurology and made valuable contributions to psychoanalysis. Some of his discoveries in neurology are of both scientific and practical value. His first paper, *Observation on the Generation of Uric Acid and Its Crystalline Forms*, was published in 1852. His next interesting work was *Researches upon the Venom of the Rattlesnake*, (1860). Mitchell was the first to state that snake venom is a double, not a single poison. In 1864 appeared his work *Reflex Analysis*. In the same year, in collaboration with Dr. G. R. Morehouse and Dr. W. W. Keen, he published *Gunshot Wounds and Other Injuries of the Nerves* which was translated into French and used in the French hospitals during the World War. The authors have pioneered in the field of peripheral nerves; described symptomatology and therapy for traumatic neuroses; discussed nutritive changes in joint, skin, nails, and hair; introduced the local use of massage in these cases; advocated injections of atropine for spastic states: and presented the first hints as to ascending neuritis. This was the starting point of Mitchell's subsequent investigations in traumatic neurasthenia.

In 1872-78 Mitchell described fully a rare nervous disease, erythromelalgia (Mitchell's disease) which affects mainly the extremities of the body and is marked by pain, redness, swelling and elevation of temperature. Osler cited this disease in his *Principles and Practice of Medicine*, remarking that Mitchell speaks of it as a "painful nerve-end neuritis."

In 1873 Mitchell published an original work, *Favorable Influence of Long Rest in Bed in the Neuralgia of Locomotor Ataxia*. In 1874 he described a new clinical entity, postparalytic chorea.¹ In 1875

1) See C. W. Burr and A. H. Quinn: *Dict. Amer. Biog.*, New York, 1934, XIII, 62-65; see also Wm. Osler, *Med. News*, Phila., 1885, XLVII, 162.

his paper on "Rest in the Treatment of Disease" appeared. In 1877 he published a monograph, "Fat and Blood," in which he described the famous "Mitchell rest cure." He advocated rest, over-feeding, massage, and physiotherapy in the treatment of functional nervous diseases. Thus, he introduced into this country the use of physical therapy in neurology.² Professor W. S. Playfair introduced with enthusiasm and success S. Weir Mitchell's rest-cure treatment to England. Mitchell's work was translated into French, German, Russian, and Italian. The success of his "rest treatment" is due mainly to the systematic coordination of various curative measures.

Of significance is his description of the surgical procedures of nerve section and nerve stretching. Mitchell recommended nitrite of amyl against epileptic attacks and considered lithium bromide as the most valuable of the bromine salts. He advocated the application of splints to procure local rest and promoted the use of massage and faradic electricity in certain nervous diseases. He suggested the use of ice and sprays to reduce pain and to relieve local spasm. He investigated the effect of meteorological changes on traumatic neuralgias. He was the first to investigate the relation of eyestrain and astigmatism to headaches and other neurotic symptoms. As an experimental investigator he made pioneer researches on the physiology of the cerebellum. In collaboration with M. Lewis he made important studies on the knee-jerk (1886).

Mitchell is the author of 171 medical papers on a variety of subjects. Besides neurology many of his articles deal with toxicology, pharmacology and physiology. He was the first to examine the poison of reptiles physically and chemically.

Among his early medical papers are included, *The Intestinal Cases* (1850); *On Various Forms of Uric Acid Crystals* (1852); *On the Influence of Some States of Respiration on the Pulse* (1854); and *A Remarkable Case of Deep and Long-Protracted Sleep* (1856). Of interest are his publications on spinal arthropathies, neurotomy, the cremaster reflex, facial tics, sciatica and hysteria. While his contributions to neurology far surpass all his other achievements, his work in the field of toxicology is also of great interest and value. They are

2) See S. R. Kagan: "Silas Weir Mitchell," *Medical Record*, New York (Feb. 3) 1937, 126; Cf. H. D. Rolleston: *Sir Thomas Clifford Allbutt*, London, 1929, 120-121.

original contributions based on experiments and deep knowledge of the subject.

Mitchell's influence on medical thought in the United States was great. His pioneer work in neurology won for him international recognition. Mitchell combined the capacity of a practitioner and an investigator in medicine, a clinician and experimenter of high standard. In the words of Dr. Garrison, he was "the historian of instrumental precision in medicine." Of honors, Mitchell received many, but I shall mention only a few of them as an illustration of his high standing in the profession. For thirty-five years he was a trustee of the University of Pennsylvania. He was elected professor at the Philadelphia Polyclinic and College for Graduates in Medicine. In 1869 he became president of the Pathological Society; in 1880, president of the Association of American Physicians; in 1884, president of the Philadelphia Neurological Society; in 1886, president of the Philadelphia College of Physicians, and of the American Association of Physicians and Pathologists; president of American Physicians and Surgeons. In 1888 he received honorary *causa* from the University of Bologna. In 1891, he was elected president of the Congress of American Physicians and Surgeons. In 1906 he received the Franklin Medal. In the same year he was elected a Foreign Fellow of the Royal Society of England in recognition of his great service to science. Five American and European Universities bestowed upon him the honorary degree of LL. D. during the years 1895-1912.

MITCHELL AS A WRITER

Mitchell did not limit himself to medical sciences. He was very active in the field of literature and became distinguished for his remarkable poems, novels, short stories and essays on historical matters. His brain was condensed with electricity whose sparks spread in different directions — in the fields of medicine, fiction and history. Most of his poems were popular. One of them was characterized by Dr. Oliver W. Holmes as follows: "It is a poet's poem — warm, plushed, even, perhaps at some points a little overheated. It shows skill, grace, feeling, fancy."

Mitchell's most interesting early poems are *A Psalm of Death and Other Poems* (1890), and *Francis Drake, A Tragedy of the Sea* (1893), which included his dramatic narratives. His *Hugh Wynne*,

Free Quaker (1897) is considered one of the best historical novels of American literature.

As a novelist Mitchell made use of the material obtained as a neurologist. Examining patients of different classes he was able to get their attitude toward life, and was thereby aided in his character portrayals.

A. R. Burr cites from Dr. Mitchell's autobiography his description of the process of scientific investigation and fiction: "In science, all sorts of things present themselves and you watch them; the facts are tested, accepted, rejected, or set aside, and at last experiments are made following some apparently fruitful idea. In fiction and poetry you wait, watching the succession of ideas that come when you keep an open mind and the form of expressing a thing has to be considered."³

Mitchell was among the earliest American physicians who united science and literature. His beautiful verses and psychological stories attracted the attention not only of the profession but also of laymen here in America, as well as in Europe.

MITCHELL AS MAN, TEACHER AND ORGANIZER

Mitchell was a commanding figure who possessed a charming personality. He was great not only as a physician and novelist, but also as a man and teacher. He was admired by all who knew him or heard of him. He was a friend of some of the greatest representatives of medicine, art and literature here and abroad. Among his close friends were Osler, DaCosta, Holmes, Billings, Hammond, Welch, and Jacobi. Mitchell corresponded with a great number of scientists, writers, and communal workers. His letters were distinguished by a witty style and impressive content. The following series of letters to Dr. Abraham Jacobi, Dr. Jacob Solis-Cohen and Dr. James J. Walsh mirror some of his traits and views. They were written in his seventies and eighties, in long hand. They have considerable biographical and historical value.

3) A. R. Burr: *Weir Mitchell, His Life and Letters*, New York, 1929, 76.

From Dr. S. Weir Mitchell to Dr. A. Jacobi.

I

[Date not given]

Dear Jacobi — I did not think it possible that anything as graceful could be said by a telegram —

Among the things a varied life has brought to me are friends — old — of youth hood — and then middle age — gifts such as you — I shall pick them up & try to keep the ranks full — But especially dear to me is medicine: poetry and fiction are to that unconsidered trifles & so is it that the friends who are in the peerage of the profession are and have long been high in my affection. Accept dear friend the gentle implication and now as these many years continue to believe me.

Yours with constant regard

WEIR MITCHELL

II

26th Jan. [year not given]

1524 Walnut Street, Philadelphia

Thank you my dear friend and generous man. The letter is worth more than the check. We were as always glad to have you with us. Yours always and all-ways

WEIR MITCHELL

Prof. Jacobi

19 E. 47th St., New York

III

Many thanks my dear Dr. for the brilliant little memoir nothing in it surprised me more than its clear vigorous English. If as I presume you are of German birth it is simply astonishing — I have read it all with the pleasure with which I read whatever you write.

Thanks —

Yrs. Sin'ly.

WEIR MITCHELL

Dr. Jacobi

Nov. 17th [year not given]

IV

Prof. A. Jacobi

June 25 [year not given]

1524 Walnut St., Philadelphia

My dear Dr

I am your debtor for your *Pflege und Ernährung*, etc, — which I

hope to look over when I get away for my holiday. — I hope you are as well & as *cool* as I could desire you to be. —

Faithfully —

WEIR MITCHELL

Pray remember me to Mrs. Jacobi.

V

20th Oct.

Dear Jacobi —

Thank you for not writing as I thank the hundreds who did write. My wife is unexpectedly well — & for fear of fresh neuritis & no escape — the spectres called anniversaries we go to see . . . us on the Nile. This will be in late December. Yrs sinisly

WEIR MITCHELL

VI

1524 Walnut Street.

My Dear Jacobi — I should before now have thanked you for the book on the *Diseases of Childhood*, but my son carried it off & today returns it with the remark that it is the freshest & most progressive book on the disorders of Childhood he ever saw. The easy use of well-digested learning strikes me most. Few have the art of seeming to own all the material they use & of making you feel that what they get from others acquires new personal values in the using.

Yrs. truly,

WEIR MITCHELL

Prof. Jacobi

March 24,

From Dr. S. Weir Mitchell to Dr. Jacob Solis-Cohen.

I

[Date not given]

My dear Doctor —

The respirometer was perfect — but in a few months got to be so foul from the decomposing organic matter deposited in it as to be useless. Da Costa had one made like mine but I think gave it up for above stated reason. Yrs truly

S. WEIR MITCHELL

II

23rd [year not given]

Dear Cohen —

Mrs. . . . has spasmodic ptosis — a rare disease — & usually of hysteric or emotional birth — I have nearly always cured it by Tonics — & the local use of Induction currents —

Also Mrs. S — has Presbyopia & needs glasses to relieve the constant strain on her eyes. Yrs with thanks

WEIR MITCHELL

Dr. Cohen

The following letter bears reference to an article of Dr. James J. Walsh, entitled "A Chapter in the History of Quackery," which appeared in the *Journal of the American Medical Association*, March 13, 1909. Dr. Mitchell himself had done some writing with regard to quacks and quackery, and was interested in the subject.

From Dr. S. Weir Mitchell to Dr. James J. Walsh.

I

S. WEIR MITCHELL, M. D.

1524 Walnut Street

Hours 9-1 daily

JOHN K. MITCHELL, M. D.

1730 Spruce Street

10-12 except Wednesdays

Philadelphia, April 7th 1909

Dear Doctor Walsh:—Thank you for this little bit on quackery. If you have further interest in the question John Billings at the Astor Library can refer you to a play which was used in, I think, the reign of Ann as an advertisement of a quack doctor. I think it stands quite alone in the history of quackery and I wonder that it has not been re-introduced as a method of advertising doctors and other things. John Billings will perhaps remember it, but if not, tell him it was one of a set of books given him for the library by Mrs. Butler Duncan. I had always meant to give a little account of it myself but other things have come and you may be enough pleased with the references to make use of it yourself. Very truly yours.

WEIR MITCHELL

Dr. James Walsh,
110 West 74th Street.
New York City.

Madam Eusapia Palladino was a famous Italian medium who had created quite a sensation in her home town of Naples, and had been invited to Cambridge, England, where she accomplished a series of feats that were said to make it perfectly clear that she was in direct touch with the spirit world. She was supposed to be a simple-minded wife of a grocer in the neighborhood of Naples, but the grocer was her second husband, and her first husband had been a traveling prestidigitator, whom she assisted in many tricks connected with his vocation. She was a very clever little woman, who found that she could make a nice living taking in those who were ready to assist at her seances. After attracting a great deal of attention in Italy and in England, she was invited to come to this country, and disturbed a good many people by the spiritistic phenomena which she produced. The following letter of Mitchell to Dr. Walsh refers to Madam Palladino:

II

November 23, 1909

Dear Dr. Walsh:— The Palladino trouble need trouble no man's soul; she has been exploded over and over years ago. I had a letter from Langley, the Smithsonian, then (1904) much troubled because some people at Cambridge, Eng., had been upset by her performances. I turned his letter over to Coleman Sellers, who wrote at least two letters explaining how the whole business was done, and amusing himself with the folly of investigators who did not pre-investigate the tricks of the conjuror. These letters are most interesting. One of them at least is marked confidential, and I hesitate about making use of it. Fortunately I kept them. I am not sure whether Coleman Sellers is alive or not. There is absolutely nothing in the whole business that cannot be done by clever conjuring. The report you are after is that of the Seybert Commission, written by its secretary, Horace Furness. I was on this Commission. It exploded every claim of the spiritualists and got to be very tiresome at last. I think you will find this in the great Public Libraries. The book may be out of print. It was published by Lippincott & Co.

Thank you for your many papers. Those about Mexico are very interesting. Yours truly,

WEIR MITCHELL

III

1524 Walnut Street, Philadelphia

March 24, 1911

Dear Mr. Walsh:— I am very much obliged by your kind note. I

regret I attend lectures less because I do not hear well enough to get much satisfaction out of them.

I made some study myself of Shakespeare's religion, and came to the conclusion that he had the wisdom not to say much about it. I could not make out whether he was a Roman Catholic or a Protestant. It was very interesting to hear Dr. Furness read Hamlet's soliloquy as Shakespeare is believed to have read it. As for "shall" and "will," in the revised version of the Bible there is a good study for you. As for Shakespeare's medicine, it is not of much account. I shall be very glad to have the book of which you speak — too much is made of it. Very truly yours,

WEIR MITCHELL

Jas. J. Walsh, M. D.

IV

April 5, 1911.

Dear Dr. Walsh:— I think you had better read DaCosta's little book on Harvey, one of the best I know; and also the recent English life of Harvey by D'Arcy Power. I went over the subject myself years ago, and if I had any doubt at all, it would have been cleared up by the storm of amazement and indignation with which Harvey's announcement of his discovery was received. In fact, the large part of its value was the determination of the true function of the heart. This ground has been threshed over by many people, and I think the matter is pretty thoroughly settled, if anything ever is — Yours very truly,

WEIR MITCHELL

Dr. Jas. J. Walsh.

V

June 6, 1912

Dear Dr. Walsh:

I shall be very glad to have a copy of your article in regard to the "water clock," because I must have missed the account of it in my rather labored study for my article on "The Early History of Instrumental Precision in Medicine," which was published separately, but was also my address as President before the Second Congress of American Physicians and Surgeons, 1891. I am sending you by this mail a copy of this address. I have sometimes thought of reprinting the paper with additional notes, in which case the "water-clock" would be considered. My article was not on the discovery of the thermometer, but the whole subject was dealt with in my paper.

Yours very truly,

S. WEIR MITCHELL

VI

Februrary 14, 1913

My dear Walsh:

Thank you very much for this book. I shall not have time to consider it before the summer, when I carry a few serious books to regale me in the canoe when the salmon will not rise. I have beforehand to find one fault with it, and that is its weight. I do not see why books should be made so heavy as to add physical labor to the reading of them.

Thank you above all for the pleasant words on the blank page, and if I have been in any way an inspiration to you, I am sure the Profession ought to thank me. The book looks very tempting, but I shall put it aside for the present.

I wish you could get here to the lecture, a card for which I enclose. It really concerns itself with a very careful study of Cardan.

Yours very truly,

WEIR MITCHELL

Dr. Jas. J. Walsh.

VII

March 1, 1913

My dear Walsh: You speak of my comparison of Luther and Washington. I did not compare Luther and Washington, it was Luther and Lincoln. Both of them had their defects, both of them were to my mind *great men*. I suppose it would be as difficult for a Roman Catholic to regard Luther with approbation as it would for me to — well, to look with favor on many another character in church history. Lord Acton is one of my delights, but I never could see how he remained a Roman Catholic. His critical letters to Miss Gladstone are most interesting. I dimly remember meeting him, as he was at one time a friend of Fannie Kemble and I saw him at the house of her daughter, Mrs. Owen Wister. But, my dear Walsh, if you and I disagreed two or three hundred years ago, we would have burnt each other up; now, we safely consider our differences of opinion with courtesy.

I want to say to you that I have lent your book to the Shakespeare Club, because of that delightful article on Shakespeare as an Irishman. It echoes very much what my friend, Dr. Furness, used to say, that if Shakespeare were to appear here and talk to us, it would be more like the talk of your Irish cook than the English of today. Yours, with repeated thanks,

WEIR MITCHELL

One of Mitchell's characteristics was kindness and cooperation to young and talented men. He liked to bring them together or to introduce them to his associates who could serve them as guides. When the poor young Japanese, Hideyo Noguchi, came to Mitchell, the latter discovered the ability of this talented student for researches and gave him his full help, and through his influence Noguchi was honored with a grant from the Carnegie Institution.

As a physician Mitchell gained the confidence and love of his patients, who rushed from many states to Philadelphia. Osler writes: "Weir Mitchell, still in harness at the Infirmary for Nervous Diseases, still glad to give freely of the treasures of his ripe and unique experience to whosoever needs them."

As a teacher Mitchell won the love of his pupils and associates. He had the gift of attracting young able physicians and stimulating them to researches in medical problems. His first lectures were given on physiology before the Philadelphia Association for Medical Instruction.

As a scientist Mitchell was a man of originality and versatility. J. M. Taylor has said of Mitchell the following:

"Weir Mitchell was vastly more than a master in medicine, a scientific searcher, a pioneer, a discoverer of many things. He was a born stimulator of researches by scores of others. He was a marvellous penetrator of human mysteries through errant phases and divagations of illness, and he found new and superior means of relieving them. . . . He had the particular genius to recognize the importance of mental energizing, the potency of exciting the persistent wish as well as the determined effort, and he had preeminently the power of persuasion."⁴

As an organizer, Mitchell was active in advancing medical sciences in the United States. Due to his efforts the library of the College of Physicians in Philadelphia became one of the greatest medical libraries in the country. He contributed to the reform in the methods of treatment in insane asylums in the United States. The great success of the Orthopedic Hospital and Infirmary for Nervous Diseases in Philadelphia was due to the efforts of its creator, Dr. T. G. Morton, and

4) J. M. Taylor: "Personal Glimpses of S. Weir Mitchell," *Ann. Med. Hist.*, New York, Paul B. Hoeber, 1929, I, 589.

to Dr. Mitchell. In 1857, in collaboration with J. M. DaCosta and S. D. Gross, Mitchell founded the Philadelphia Pathological Society. Mitchell collaborated with Dr. P. W. Pepper in the advancement of the School of Medicine and in the establishment of the Department of Hygiene at the University of Pennsylvania.

Mitchell was a prime mover in American medicine. At that period the progress of American medicine was in the sphere of clinical investigation. Mitchell, under the influence of French experimenters and with the aid of Professor Reichert and Dr. W. A. Hammond, was among the first American experimenters in medicine. He was also a pioneer in neurology.

Mitchell's medical contributions have the merit of depth, clearness and originality. Some of his studies are now a part of common knowledge, but at that time they were new and inspiring, and aroused cooperation, criticism and skepticism. His work in the field of physiology was unnoticed, but his contributions to toxicology, his experimental studies upon the venom of the rattlesnake and the poison of serpents, his investigations in the field of toxic albumens and comparative physiology among reptilians, aroused at that time great interest in the profession. It was pioneer work introducing the laboratory as the basis of the medical sciences.

Dr. Mitchell's literary work furnished ample material for psychologists and lovers of literature and art. He left a splendid heritage, not only to medical literature, but also to general literature. His work reflected his versatility, his character, his principles and his aspirations.

Dr. Mitchell died on January 4, 1914, at the age of eighty-five.

Mitchell's works in medical science include: "Research on the Venom of the Rattlesnake," 1860; "Gunshot Wounds and Other Injuries of Nerves," 1864; "On Injuries of the Nerves and Their Consequences", 1872; "Fat and Blood," 1887. Among his other writings are: *The Hill of Stones*, 1882; *The Masque*, 1887; *Commemorative Addresses*, Phila., 1887; *The Psalm and Death*, 1890; *Characteristics*, N. Y., 1892; *An Early History of Instrumental Precision in Medicine*, New Haven, 1892; *Collected Poems*, 1896; and *The Autobiography of a Quack*, 1900.

The most important biography is A. R. Burr's book, *Weir Mitchell, His Life and Letters*, New York, 1929, which contains a bibliography of Mitchell's writings from 1846 to 1914, pp. 397-413. Appreciation of his character and achievements are also given in "S. Weir Mitchell, M.D., LL.D., F.R.S., 1829-1914, Memorial Address and Resolutions," Phila., 1914. Other sources are: J. G. Gray,

Memoir, read at the Quarterly Meeting of the St. Andrew's Soc. of Phila., Feb. 28, 1914; B. S. Tucker, *S. Weir Mitchell*, Boston, 1914; W. Talcott, "Dr. S. Weir Mitchell," *Century Magazine*, New York, LVII, 1928; William Osler, "Weir Mitchell," *Bull. Johns Hopkins Hosp.*, Balti., 1889-90, I, 64; *idem.*, *Brit. M. J.*, 1914, I, 120-121; C. W. Burr and A. H. Quinn, *Dict. Am. Biog.*, N. Y., 1934, XIII, 62-65; C. W. Burr, *The S. Weir Mitchell Oration*, Phila., 1920; F. H. Garrison, *History of Medicine*, Phila., 1922, 697-698; H. S. Morris, "S. Weir Mitchell," *U. Penna. Alumni Register* (Feb.) 1914, XVI, 319-320; F. R. Packard, *History of Medicine in the United States*, 1931, 1187; C. L. Dana, "Medicine of the Humanities, The S. Weir Mitchell Oration," *Tr. Coll. Phys.*, Phila., 1922, 518-532; H. W. Cattell, *International Clinics*, J. B. Lippincott Co., 1925, II, 4-5; S. R. Kagan, "S. Weir Mitchell," *Med. Record*, N. Y. (Feb. 3) 1937, 126-128; Sir L. Brunton, *Nature*, London, 1913-14, XCII, 534; J. J. Putnam, *Boston M. and S. J.*, 1914, CLXX, 821-825; C. K. Mills, *J. Nerv. and Ment. Dis.*, N. Y., 1914, XLI, 65-74.

CHAPTER IV

DR. ABRAHAM JACOBI

(1830-1919)

It is one thing to build an educational castle in the air at your library table, and another to face its actual appearance under the existing circumstances.

— WILLIAM H. WELCH

Dr. Abraham Jacobi was a pioneer in pediatrics, a foremost physician, ideal teacher, author, historian, and organizer. For sixty-six years he was an active and successful practitioner and inspired others to work for the advancement of medical science. For forty-two years he taught and contributed to the development of pediatrics (1857-99).

Jacobi was the first man to occupy a chair of children's diseases in the universities of the United States. In 1857 he lectured on pediatrics at the College of Physicians and Surgeons in New York. This was the starting point of clinical and scientific pediatrics in this country. Jacobi became the first professor of infantile pathology and therapeutics at the New York Medical College (1860-64). In 1862 he established a pediatric clinic in the New York Medical College building which existed two years. In this way he inaugurated pediatric bedside instruction in America, which antedated bedside teaching in internal medicine in the United States. During 1865-70, Jacobi occupied the clinical chair in the same subject in the medical department of the University of New York. He was clinical professor of diseases of children at the College of Physicians and Surgeons, Columbia University (1870-99).

Dr. Abraham Jacobi was a broad-minded teacher and a skilled lecturer who loved his occupation, profession and pupils. Dr. Abraham Levinson says that Jacobi as a teacher in pediatrics ranks first and foremost in the United States, for he was the man who put pediatrics in

American medical colleges on a footing with other branches of medicine. Outside of his lectures on children's diseases and general medicine, Jacobi grouped around himself many young talented physicians and stimulated them to further their studies and researches in various branches of medicine. His opportunities at that time were confined to clinical research because laboratory research had not yet been developed. In addition to his official teaching, he was teaching indirectly by his writings, as many physicians who wanted to specialize in pediatrics studied Jacobi's standard work.

CONTRIBUTIONS TO MEDICINE

Jacobi wrote numerous original contributions to medicine. He is the author of treatises on diseases of the larynx and on diseases of women and children (1859), dentition (1862), education of abandoned children (1870), infant diet (1872), diphtheria (1876), intestinal diseases of infancy and childhood (1887), diseases of the thymus gland (1889) and therapeutics of infancy and childhood (1896-1903); the last-named was translated into Italian, German, and Russian. The German government, which found it necessary to imprison Jacobi in 1851, called him back in 1893 to occupy Henoch's chair at the University of Berlin. However, Jacobi's love and gratitude for his adopted homeland resulted in a refusal of the honor offered to him by German authorities; he preferred to work for the progress of medicine in the United States.

Jacobi's numerous contributions are of both scientific and practical value. His instructions on the care and hygiene of infants are classical. According to Dr. A. Levinson, Jacobi's work on infant feeding was revolutionary in character. Jacobi not only emphasized the importance of breast feeding, but he was, possibly, the first man to realize the significance of boiling milk. He advocated the cereal decoctions with milk for infant nutrition and the use of cane sugar in place of milk sugar. He recognized the fallacy and danger of washing the infant's mouth. When intubation was described by O'Dwyer, Jacobi was one of the first in this country to make use of it, and pointed out its superiority over tracheotomy. When diphtheria antitoxin was discovered by Behring, Jacobi was one of the first doctors in America to practise its use, although he was opposed to Behring's manner of disposing his remedy. He was interested in utilizing the

practical discoveries in medicine, and enlisted others in this pursuit. He first called attention to the fact that congenital lipomata are lobulated and uncapsulated. He expressed original doctrines on various forms of diarrhea. He opposed the storm of therapeutic nihilism and emphasized the beneficial action of many drugs. In general his work was developed from extensive observations and from fundamental facts.

In 1854 Jacobi invented a small oval mirror having a wooden frame and flexible handle and used it successfully as a laryngoscope. As a man of science, he did not care to patent his discovery.¹

CONTRIBUTIONS TO MEDICAL HISTORY

Besides his work in the field of clinical medicine he also contributed to medical history. His writings on this subject are of great interest; notable are his authoritative histories of American pediatrics (1902-1913), of diphtheria (1880), a history of cerebrospinal meningitis in America (1905) and a history of pediatrics in New York City (1917). He emphasized the need for teaching the history of medicine and strongly advocated the inclusion of medical history in the curriculum. He also lectured frequently on the history of medicine and inspired many students and physicians to make researches in this branch of medicine.

Many authors and historians sought his advice and encouragement in research work. For illustration, the following acknowledgments of three eminent historians are cited: Fielding H. Garrison remarks in his *Pediatrics in the English Language*: "In selecting and arranging the pediatric writers of the modern German school, I wish to acknowledge the valuable information kindly furnished me by the late Dr. A. Jacobi, whose advice to younger men was ever generous, encouraging and sympathetic." James J. Walsh in the dedication of his work, *History of Medicine in New York*, writes: "To Dr. Abraham Jacobi: To you I owe the incentive to my first essay in historical medicine, the History of the Medical Society of the State of New York; now that this larger work has come, it seems but proper that it should appear under your patronage and chronicle." Victor

1) F. H. Garrison, personal communication; V. Robinson: "Life of A. Jacobi," *Medical Life*, N. Y. (May) 1928, 227.

Robinson in his *Life of A. Jacobi*, states: "As one who received much from Jacobi the present writer wishes to place his obligations on record. . . . When the first edition of *Pathfinders in Medicine* was ready for press, it was inevitable that we turn to Jacobi for the Introduction, and his patronage helped the book make its way."

OTHER ACTIVITIES

Dr. Jacobi was a great factor in American medical life. His activities in various fields of medicine were manifold and significant. He possessed organizing and executive ability. He organized several pediatric societies. He was the organizer of the Children's Department of the Mount Sinai Hospital in New York, was one of the founders of the German Hospital (now called the Lenox Hill Hospital) and the organizer of its Children's Department. He founded and assisted in the publication of several pediatric periodicals. He was also a founder and editor of the *American Journal of Obstetrics*, which was one of the best periodicals of its time devoted to a special subject. He helped the work of Dr. John S. Billings and secured the Congressional appropriation for printing the *Index Catalogue* (1879). In 1862 Jacobi established the first free clinic for diseases of children and published his report on this clinic, the first report of its kind. He stimulated organized medical activities, and was a constant participant in many medical meetings. It is characteristic of him that he once gravely rebuked the historian F. H. Garrison for disinclination to attend such meetings. At the memorial service held in the Academy of Medicine at New York City on July 14, 1919, after Jacobi's death, it was stated that the Academy owed its great success mainly to A. Jacobi's wisdom and sagacity.² At Jacobi's suggestion the New York Laryngological Society was merged, in 1885, into the Laryngological Section of the Academy of Medicine.

Jacobi was interested in sociological problems connected with medicine; for instance, he opposed prohibition, advocated birth control, discussed the questions of midwifery, of crime, of child labor, of capital punishment, and of poverty. He served on many important committees dealing with such problems and was recognized as an authority on subjects related to medical life. He was active in ques-

2) E. Preble: *Dict. Amer. Biogr.*, 1932, ix, 563.

tions of public welfare and went several times to the legislature of his state to fight for certain sociological problems.

Jacobi delivered many classical addresses on various medical problems which impressed the profession deeply. Thus, his presidential address before the American Medical Association in 1912 called for comment here and abroad. Jacobi's remarkable address on Virchow and his scientific labors was published in the *New York Medical Record*. Samuel D. Gross wrote to Jacobi on this occasion that this admirable address "should be in the hands of every medical student and every lazy doctor to show them what this great man has done for his profession."

Dr. James J. Walsh wrote me about some of his personal recollections of Dr. Jacobi's early days in practice in New York.

When I first knew Doctor Jacobi, he told me some recollections of his early days in practice in New York. He was located on the lower East Side, where there is a larger proportion of children than anywhere else in New York. He was already inclined to limit his practice to children's diseases, and that kept a man busy in lower New York at that time. He used to be called out often at night, and never failed to respond. He dwelt particularly on the calls that came to him in the early morning hours. He thought that if he were summoned at four to five o'clock in the morning, he would be thoroughly awaked by the call, and would not go back to bed again because this afforded him an opportunity to catch up with his medical reading. He was particularly interested in the medical magazines because they contained what was latest in medicine, while the text-books were already beginning to be out of date when he got to them.

Jacobi himself was a great believer in medical society meetings as representing the very latest things that were occupying physicians at that time. He himself was most faithful in attendance at society meetings of all kinds. Fifty years later than this experience on the lower East Side the presence of Dr. Jacobi at any medical meeting of any importance could surely be counted on. If he had something to say, he said it plainly and straightforwardly, and let it go at that. Like Osler, Jacobi encouraged young physicians to keep up to date in their specialties, but not to specialize too early in their careers. He realized how important it was for men to obtain good grounding in general medicine before segregating themselves from the great body of physicians.

Jacobi had an international reputation and he had a correspondence with many leaders of medicine all over the world. His collection of medico-historical events was of particular interest.³ He wrote to F. H. Garrison on this subject as follows:

19 East 47th Street

Bolton Landing, July 26, [1914]

Dear Dr. Garrison — Excuse the fragmentary character of my epistles. Whenever I find anything referring to Billings I shall send it. I am engaged in looking over old papers, letters, etc., between 1848 and — have destroyed about 4000, and find many valuable things. Now, I am 84 and may die any time. Much of what I have I shall keep — with the intention of burning up after my death. Much may be worth preserving in a safe place. There are about 50 or more letters, or sets of letters from (very) great men, etc., etc. many personal, many of some public interest. You mentioned the value of preserving any such things. They are too good to be burned by me. Do you think you care for the bundle? What you do not wish you may burn or return to me; so that I may enjoy so long — if it be long — as I shall live. Just a line to divert me. . . . Sincerely yours,

A. JACOBI

Dr. James J. Walsh wrote his first book on a medico-historical topic, *The History of the New York State Medical Society*, at the suggestion of Dr. Jacobi, who felt that the State Society's unique position in the history of American medicine should be chronicled. Subsequent books published by Dr. Walsh were brought to the attention of Dr. Jacobi, who allowed himself an older man's privilege of criticizing them freely. The following letter refers to the volume *The Popes and Science*, which was mainly a response to certain portions of Professor Andrew D. White's *History of the Warfare of Science with Theology in Christendom*.

From Dr. A. Jacobi to Dr. James J. Walsh.

3) Jacobi lost his important collection of documents and notes for publication when a fire burned his summer home at Lake George. According to Preble, this loss was "one of the greatest misfortunes the medical profession of the United States has ever sustained." (E. Preble, *Dict. Amer. Biog.*, 1932, IX, 563-564).

I

19 East 47th Street

August 5, 1908

Dr. James Walsh

Dear Doctor, In your "Popes and Science" I have read a good deal. If I were to write a criticism I should have to mention some inequalities, for instance the great length of your chapter on Dante, and the excess of polemics against White. When you have a man down, stop pounding him. But the only thing I want to express is my thanks for your gift and the satisfaction I had in reading. You have succeeded in getting a film . . . of spiderwebs out of my brains; and that is worth thanking for, is it not. When a man is getting old, he is more than ever requiring truth, and that you have given me, I believe without mistakes of your own. Being a mugwump in theology as in politics I never was raving mad against "popery," appreciating the good the Church has been doing while it was the only source of civilization, though I was brought up under the influence of "protestantism." At an early time I doubted the coarse Luther, and his persecution of Thomas Münzer and the "peasants' wars," and the barbarous Calvin and the whole tribe of jealous secessionists, and lately, alongside with your book, I have read in Putnam's *Censorship of the Church of Rome* which is a good and just book and makes me enjoy my old independence. Still I did not wish to prove that senecuts loquat . . . but merely to say: Thank you. Yours is a good and *very* readable book.

Yours very sincerely,

A. JACOBI

In connection with Jacobi's interest in medical history it is of interest to reproduce another of his letters to Dr. Walsh.

II

19 East 47th Street, New York

Dear Doctor Walsh

I well remember the day when I conversed with O'Dwyer about his labors and his disappointments extending over a long time. I said I hoped he would be more satisfied after [two words here cannot be deciphered] Bouchut.

Who is that, who is Bouchut? The fact is he never knew anything about him. We Americans never know about history. It is you and few besides you, Garrison mainly, who teach us knowledge of and taste for history.

Accept my thanks for your book, and more for the inscription.

Very truly yours

Dec. 3 [Year not given]

A. JACOBI

From Dr. Abraham Jacobi to Sir William Osler.

Dear Osler, As you know these men belong to the best of the Germans. I am sorry I find no more; except Rhen (Frankfurt) whom I shall send in a day or two. In my country place I have Baginsky, a good picture which was taken 4 years ago. I shall send for it, to transmit to you. I shall write again. . . . You are a wonderful man. I trust you will not kill yourself by work.

Fifty years ago, — I shall try to learn the exact time — I offered a prize of 400 dollars (I had more money then than at present) for a history of American Pediatrics. No results in a year. Next year I did the same — no results.

P. S. Looking over Baginsky Festschrift (*Arch. of Kindheitskunde*, vol. 60-61) I find the same picture of the man when he was 70 years old. A few days ago I was pleased to find here your second edition. Never write an apology for anything you do. I shall compare it with the first, and thank fate for making men like you.

Sincerely, A. JACOBI

October 20

Jacobi was born of Jewish parents in the village of Hartum, Westphalia, Germany, on May 6, 1830. His parents were not well-to-do and he acquired his education through struggle. He first entered the village school and the gymnasium at Minden, then matriculated at the University of Greifswald in 1847, and finally graduated in medicine from Bonn University in 1851. He was identified with the revolutionary movement in Germany and was imprisoned for two years. In 1853, he migrated to America and settled in New York at 20 Howard Street, where he practised medicine for sixty-six years.

Jacobi died on July 10, 1919, at Bolton Landing, New York, at the age of eighty-nine years.

TRIBUTES TO DR. JACOBI

With his sound ideas on medical practice and his great interest in all medical events, it was no wonder that as time went on Dr. Jacobi came to be one of the best known physicians, not only in New York, but throughout the country; and that he was accorded the distinction of being the president of a number of medical societies, including particularly the Academy of Medicine (1885-89) which was then, as now, one of the most prominent medical societies in the land. Jacobi was highly honored by the profession and the community. He

was president of the New York Obstetrical Society (1868), of the New York County Medical Society (1870-72), of the New York State Medical Society (1882), first president of the American Pediatric Association (1888), president of the Association of American Physicians (1896), and chairman of the American Commission to the Fourteenth International Medical Congress at Madrid (1903), president of the American Medical Association (1912), and was honorary member of many American and European medical societies. He received an honorary LL. D. from the University of Michigan (1912), from Columbia University (1900), from Yale University (1906), from Harvard University (1906), and from Jefferson College (1913).

The appreciation of the great services done by Jacobi for the advancement of American medicine and for humanity is evidenced also by the following notable facts. Francis Huber established the Jacobi Ward at the Roosevelt Hospital (1898). Mrs. A. Vaerishoffer founded the Jacobi Division of the German Hospital (1910), for the purpose of providing for the continuation of bedside teaching in pediatrics. This hospital has a special pavilion named after Jacobi. The Mount Sinai Hospital of New York has erected in its building a statue of Jacobi. In 1900 Jacobi was presented a loving cup to commemorate his seventieth birthday by the section of Diseases of Children at the American Medical Association Convention. In the same year at his seventieth birthday Jacobi was presented with a *Festschrift* compiled with contributions from various nations by his colleagues and former pupils. In America only two such dedicatory books were previously given, to Dr. B. G. Wilder and Dr. W. H. Welch. This gift impressed Jacobi very much. It had been proposed by leaders of the profession to commemorate his ninetieth birthday in 1920 with another memorial volume containing a complete bibliography of his publications to be followed by a selection of his best utterances, but he died suddenly in 1919. In 1936 Jacobi was honored by the American Pediatric Society with the dedication of an acre of fir-wooded land as a memorial park in his honor.⁴

The philanthropist, Nathan Straus, on May 6, 1916, at a testimonial dinner given in honor of Jacobi's eighty-fifth birthday, declared: "He was my inspiration, my counsellor and friend, and I come here

4) See S. R. Kagan: *Jewish Contributions to Medicine in America*, Boston Medical Pub. Co., 1939, 614.

to lay at his feet whatever I have been able to do in bringing about the pasteurization of milk and in establishing the Preventorium. I come here to offer my years of work in saving babies' lives and in preventing tuberculosis as tribute to the man who inspired it all, Abraham Jacobi."

Osler, at the dinner at New York in 1900 in honor of Jacobi's seventieth birthday, pointed out: "It may be said that the safety of a nation depends on the care of its infants, and no one in this country has done so much for their bodily welfare as Dr. Jacobi." Later, in 1914, at the dinner held at London in celebration of the Jewish Historical Society of England on its twenty-fifth anniversary, Osler said: "The father of the profession today, a man universally beloved, is Abraham Jacobi, full of years and honors."⁵

Dr. F. H. Garrison made the following tribute to Dr. Jacobi: "In the year of 1853, there came to New York one who was destined to exert a profounder influence upon American pediatrics than any other physician of the present or past. . . . As our first teacher and professor of pediatrics, as the founder of bedside instruction in this country, as the founder of the pediatric sections of the American Medical Association and the New York Academy of Medicine, as the first president of the American Pediatric Society, he became through years of dignified labor and distinguished honor, the leader and the Nestor of his profession in the United States. . . . Jacobi's professional skill and effort prepared for fine professional work numerous students who later became eminent in American medicine."⁶

Dr. Victor Robinson has remarked: "It was Jacobi's task to rescue pediatrics from the protecting but often hindering skirts of gynecology; hitherto, timidly sharing the crowded seat of obstetrics, it was now placed in a chair of its own . . . he brought the cradle into medicine, he taught a nation how to feed its infants, and childhood is safer because of the life-work of Abraham Jacobi."⁷

Dr. Isaac A. Abt said of Jacobi: "Abraham Jacobi was a great pathfinder, humanitarian, writer, teacher and physician. It is especially fitting that the pediatricists gratefully express their appreciation of his

5) Wm. Osler, "Remarks," *Maryland M. J.*, Baltimore, 1900, XLIII, 320-322; *idem.*, "Israel and Medicine," *Menorah Jour.*, New York, I (June) 1915, 149.

6) F. H. Garrison: "Pediatrics," Abt's *Pediatrics*, 1923, I, 106.

7) V. Robinson: "Life of A. Jacobi," *Medical Life*, N. Y., 1928, 298.

leadership, for it was Abraham Jacobi who laid the foundation of pediatrics on this continent and no one has exercised a wider or more permanent influence in that field than he. It is not only America, his adopted homeland, that owes him a debt of gratitude. His influence was international.”⁸

The record of the medical activities of Jacobi during his long life justifies the fact that he is known in this country and in Europe as “The Father of Pediatrics in America.” We admire his great vision, his clarity of thought, his dynamic force. We are deeply impressed with his pioneer work in American medicine and with his devotion to humanity.

Jacobi was a prime mover in American pediatrics and aided in its development, thereby becoming a benefactor of mothers and babies. At that time his fundamental work was of particular interest and importance, as this was the cornerstone of researches, progress and discoveries in the field of infantile nutrition, made by numerous American investigators during the last half century.

Jacobi's publications include *Dentition and Its Derangements*, 1862; *Infant Diet*, 1874; *Treatise on Diphtheria*, 1880; *The Intestinal Diseases of Infancy and Childhood*, 1887; *Therapeutics of Infancy and Childhood*, 1895; and *Collectanea Jacobi*, 1909.

The chief source of biographical information is Dr. Victor Robinson's work, “The Life of A. Jacobi,” *Medical Life*, New York (May and June) 1928. Other works on Jacobi are: F. H. Garrison, “Dr. Abraham Jacobi,” *Science*, n. s. (Aug. 1) 1919, L, 102-104; *idem.*, *Abt's System of Pediatrics*, Phila., 1923, 105-108; *idem.*, *History of Medicine*, Phila., 1922, 686-687; *idem.*, “Abraham Jacobi: Memorial Notice,” *Ann. Med. Hist.*, N. Y., 1919-20, II, 194-195; J. J. Walsh, *History of Medicine in New York*, 1919, IX, 92; A. Levinson, Pediatric Number, *Medical Life* (Oct.) 1928, 466-472; S. R. Kagan, *Jewish Contributions to Medicine in America*, Boston Medical Publishing Co., 1939, 140-143, 523 notes, No. 1, 614; *idem.*, “Abraham Jacobi,” *Medical Record*, New York (Apr. 5) 1939, 227-229; F. T. Hane-man, *Jewish Encyclopedia*, New York, 1916, VII, 44; Proceedings and Addresses at the Complimentary Dinner tendered to Dr. A. Jacobi, May 5, 1900; *Tr. Cong. Am. Phys. and Surg.*, New Haven, 1884.

8) I. A. Abt: “Abraham Jacobi,” *Medical Leaves*, Chicago, 1937, I, 11.

CHAPTER V

SIR THOMAS CLIFFORD ALLBUTT

(1836-1925)

To you, Sir Clifford, in fuller measure than to any one in our generation, has been given a rare privilege: to you, when young, the old listened as eagerly as do now, when old, the young.

— SIR WILLIAM OSLER

The first requisite for a physician is spiritual charity and the next requisites are sympathy and a sense of humor.

— WILLIAM H. KING

Sir Thomas Clifford Allbutt was born on July 20, 1836, in Yorkshire, where his father Thomas was vicar from 1835 to 1862. He was educated at St. Peter's School, York, one of the oldest in England, founded as far back as 627, where he was described as the best in the two subjects of classics and mathematics combined. The ancient inspiration of this school influenced the young Allbutt, who afterwards was most insistent on the proper use of words. Entering Gonville and Caius College, Cambridge, Allbutt gained a Caius Scholarship in classics in 1856. Three years later he was awarded a Mickleburgh scholarship in chemistry, and in 1860 he received a Caius scholarship for anatomy. He received the degree of B. A. in 1859, and was the only one in the first class of the Natural Sciences Tripos who gained distinction in chemistry and geology.¹ He received his degree of M. A. in 1867, and M. D. in 1869 from the Medical School of St. George's Hospital in London. As a student at this institution, and then in Paris, he was influenced in his medical thoughts by Bence Jones, John W. Ogle, Armand Trousseau and G.-B.-A. Duchenne (of Boulogne). In 1861 he was for some time a pupil of Sir William

1) Sir Humphry Rolleston, personal communication.

Jenner. Allbutt then settled in Leeds, where he practised medicine for twenty-eight years (1861-89). He was appointed physician to the Leeds House of Recovery (1861-67) and to the Leeds Dispensary and Leeds General Infirmary in 1864.

Dr. Allbutt became prominent at Leeds not only in medical, but also in philosophical circles. In recognition of his valuable achievements, he was elected to high positions and many degrees were conferred upon him. Thus in 1864 he was elected a member of the Council of the Medical School, a lecturer on medicine and materia medica, and curator of the Materia Medica Museum. In 1866 he was elected lecturer on comparative anatomy and Fellow of the Royal Medical and Chirurgical Society in London. He was elected president of the Philosophical and Literary Society (1898), Fellow of the the Royal Medical Society (1880), and consulting physician to the Infirmary (1884). At the annual meeting of the Association of American Physicians in 1920, he was elected the first honorary member living outside of America. He received the degrees of hon. M. D., D. Sc., D. C. L., LL. D., and K. C. B. from institutions, organizations and the British government. During his long career in medicine, covering a period of sixty-four years, he received almost every honor available to a medical man.

In 1889 Allbutt moved to London, where he accepted a Commissionership in Lunacy and held that office until 1892, when he was appointed Regius Professor of Physic at the University of Cambridge, a position he held for thirty-two years until his death. In 1908 he was elected the representative of the University of Cambridge on the General Medical Council from 1908 to 1918. In 1915 he became honorary Colonel, Eastern Division, R.A.M.C. In 1918 he became the first president of the Papworth Village Settlement for Tuberculosis (1918-25). He was president of the British Medical Association from 1915 to 1920, and in 1913 he was an original member of the Medical Research Committee (National Health Insurance).

Allbutt had many friends among eminent American physicians, such as W. H. Welch, W. Osler, J. S. Billings, W. S. Thayer, H. Cushing, and F. H. Garrison. He visited the United States twice. In 1898 he lectured on "Medicine in the Nineteenth Century" at the Johns Hopkins University and gave the Lane Lectures at San Francisco. Again in 1904 he visited Baltimore where he addressed the

opening of Osler's new clinical amphitheatre at the Johns Hopkins Hospital.

The following are two letters of Sir Clifford Allbutt, selected from many addressed to Colonel Fielding H. Garrison of Washington, D. C.

St. Radegunds, Cambridge, Feb. 27/20

Dear Garrison, I am most thankful to think that any poor words of mine were not wholly inadequate for this theme. We have a meeting in Beford on Saturday next to consider a memorial of Osler. This I hope will be international. Osler was not the possession of any one nation. And I was delighted to receive your enclosure on dear Jacobi. Two rare men gone. . . . Your summary of W. O's works stands out splendidly. . . . The Spanish element is very curious, & I did not think of it. I shall carry your invaluable article with me to Oxford next week. Your history of Jacobi's early life is quite newsy & how your description of his person (top of Col. 6 second page) brings him before me!

Always cordially & sincerely yours,

CLIFFORD ALLBUTT

St. Radegunds, Cambridge, Oct. 8, '21

Dear Dr. Garrison —

The kind & so generous words of your last letter are very gratifying to me. Some of them largely come out of your friendly feelings, which are dear to me. I should like also to hope for something of impartiality in them. It is the quarter from which such words issue that gives them their value. . . . Yours always sincerely,

CLIFFORD ALLBUTT

Allbutt was a medical writer with a powerful and pleasing literary style. His writings were distinguished by their soundness of thought and beautiful literary composition. He held that good diction and literary style were as desirable in science as in literature. As a teacher Allbutt was most impressive. His ability in oratory, his friendly personality and his scholarly lectures captured his audiences. Allbutt was very humane and kind. Although his distinction and reputation were great, he never showed the smallest trace of pomposity nor superiority.

There is a striking resemblance between Allbutt and Osler, who had in common their traits, work, and high ideals. Both were extremely modest and courtly in manners, lacking the attitude of superiority. Both were silent regarding their own achievements but full of

praise of the accomplishments of others. Both had a genius for friendship and hospitality. Both were lovers of books, omnivorous readers in English, French and German, and were well versed in Latin and Greek. Both were human dynamos who tirelessly worked during their lives in the same aspects of medical life.

Both were sons of clergymen, and this origin was marked during the lives of Osler and Allbutt by their preaching morality and medical ethics. F. H. Garrison remarked that Allbutt was the spiritual aristocrat just as Osler was an essential democrat in professional relations. Both had common friends among the American and British profession. Both were devoted and sincere friends, and their friendship was cemented by their common interests in medical affairs, scientific work, and literature. These two Regius Professors appeared as brothers in the eyes of their friends who knew them best.

Allbutt and Osler were great physicians, scholars, teachers, organizers, and writers. Each of the two added much to medical knowledge and medical history and influenced considerably medical ethics and medical education. Each of the two assisted at the founding of the Pathological Society of Great Britain and Ireland (1906). Both were members of a committee for the promotion of scientific investigations of chronic, incapacitating diseases, and they helped in the foundation of the Cambridge Hospital for Special Diseases (1912). Both were the heads of the Section of the History of Medicine at the Royal Society of Medicine (Osler was elected the first president and Allbutt one of the first vice-presidents of the Section in 1912). Both aided in the foundation of the Association of Physicians of Great Britain and Ireland in 1907. Both were among the first in England to advocate systematic university instruction in medical hydrology (1914). Both were on the advisory committee and consultants at a special hospital for disorders of the soldiers' hearts at Hampstead, which was established in 1916. Both enthusiastically presented to the British government their services during the World War, and both wrote a letter in *Lancet* (1916) in which they urged medical men to give service to the Navy and Army during the war. The subject matter and style of Allbutt's "Medical Study and Practice" (1871) are similar to those of Osler's *Aequanimitas* (1889) and "Unity, Peace, and Concord" (1905). Allbutt's address before the British Medical Association in 1897 on the relative importance of theory and of practice in the art of medicine expressed identically the same principles voiced by Osler in

many of his addresses. Both raised the academic status of the university professorship by their experience, reputation, and authority, which was gained by their extensive activities in the medical world. Both prepared the ground in England for the establishment of full-time professors of medicine and clinical units (1918). Both were the principal and beloved speakers on the most national and international medical conferences.

There was also a curious coincidence in the similarity of their careers. Each of the two was elected to membership in the Royal College of Physicians of London in 1878. Thereafter began a parallelism in the careers of these two great humanists and leaders. Allbutt became Regius Professor of Physic at Cambridge in 1892 at the age of fifty-six, and Osler became Regius Professor of Medicine at the sister University of Oxford in 1904 at the age of fifty-five. Both were elected fellows of their Colleges in 1883. Both were Goulstonian lecturers. Both Allbutt (1900) and Osler (1906) gave the Harveian Oration at the Royal College of Physicians of London. Both gave the Linacre Lecture at St. John's College in Cambridge.²

Allbutt had a clear and far-seeing conception of medicine and was more concerned with general principles than with details. His medical work covers a wide field of medical problems, including cardiology, nervous diseases, tuberculosis, pleuritic effusions, and typhus fever. As early as 1869 he advocated morphine hypodermically in dyspnoea of cardiac diseases, when hypodermic medication was yet in its infancy. In the same year he was among the first to call attention to the bad effects of repeated injections of morphine. In the next year he did pioneer work in showing the effects of overwork and strain on the heart and great blood vessels. Observing a great number of cases of cardiovascular disease in young subjects of healthy build, previously unaffected by constitutional disease, he concluded that mechanical strain was an important factor in their condition. The importance of physical overstrain on cardiac disease was independently described by an American clinician, Dr. Jacob M. DaCosta (1833-1900) of Philadelphia who reported the irritable soldier's heart.³ At that time it was gener-

2) H. D. Rolleston: *The Right Honourable Sir Thomas Clifford Allbutt*, Macmillan & Co., London, 1929, 74-76.

3) See S. R. Kagan: *Jewish Contributions to Medicine in America*, Boston, 1939, p. 22.

ally accepted that heart disease in the young was due to acute rheumatism and in the old to atheroma. The perspicacious observation of these great clinicians discovered a new factor in cardiac disorders, namely, physical strain.

In 1894 Allbutt presented a new conception of the aortic region of angina pectoris. He stated that it was due to disease of the first part of the aorta, and not to coronary disease or myocardium. In 1924 Karl F. Wenckebach, of Vienna, confirmed this statement in his lecture before the Royal College of Physicians of London, stating that he had proof of the correctness of the contention of "the best authority on angina pectoris of this time, — your highly honored, even right honourable, Nestor of teachers of Medicine, my faithful friend in sunny and in dark years, Sir T. Clifford Allbutt." Allbutt expressed his satisfaction that his hypothesis concerning angina pectoris which he pronounced thirty years ago was now confirmed by one of the greatest authorities. Allbutt propounded his hypothesis concerning angina pectoris in 1889, but it was not accepted by the medical writers. Only Osler remarked in his *Principles and Practice of Medicine* that Allbutt's view "has much to recommend it."

In 1894 Allbutt first stated that hyperpiesia or idiopathic high blood pressure (essential hypertension) is not due to renal disease or arteriosclerosis. He introduced the term "senile plethora" or "hyperpiesia" to cases of hypertension that occur in otherwise healthy persons after middle life. Later in 1907 he pointed out that it should be regarded as the cause rather than the consequence of arteriosclerosis. He said that raised blood pressure must be due either to viscosity of the blood or to the constriction of the vessels in the splanchnic or musculo-cutaneous systems.

In 1865-66 he treated typhus fever patients by open-air methods, which method at that time was revolutionary (Rolleston). In 1924 Allbutt published a letter in *Lancet* in which he described his precautionary method of preventing typhoid thrombosis by changing the patient's posture.

As is well known, Trousseau advocated draining pleuritic and pericarditic effusions instead of the usual blistering. Allbutt first practised and then preached the doctrine of draining and opening the pericardium. He introduced Trousseau's paracentesis into the Leeds Infirmary and into England. In 1866 he advised paracentesis

in pericarditis with an effusion by puncturing with a trocar and canula instead of employing a bistoury as Trousseau suggested.

In 1867 Allbutt devised a short, self-registering, pocket clinical thermometer which came into vogue in 1868. The clinical thermometer was employed in the seventeenth century, but it was six inches long and therefore too cumbersome for general practice until the second half of the nineteenth century, as a result of Allbutt's invention. In 1870 when climbing in the Alps, he used his thermometer to study the effect of exercise on bodily temperature. He was one of the first to advocate the establishing of the routine use of the sphygmomanometer in medical practice. He clarified the relation between hypertension and arterial disease.

In 1867 he presented a philosophical essay on the significance of skin affections in the classification of disease. In 1868 he first described the histological changes in syphilitic disease of the cerebral arteries, and the following year he was the first in Great Britain to report on the articular lesions discovered in locomotor ataxia in 1868 by J.-M. Charcot. In 1870 he published an article on the propagation of enteric fever, pointing out the water-borne spread of the disease. As a member of the Alpine Club he accomplished much for the mountain cure of phthisis.

Allbutt's pioneer work on the use of the ophthalmoscope in diseases of the nervous system and of the kidneys appeared in 1871. On the basis of his own observation he reported primary optic atrophy in general paralysis of the insane and the condition of the optic disc in meningitis. He suggested the term "choked disc" instead of Graefe's "Stauungspapille" for the condition frequently seen in intracranial disease.⁴ The establishment by Allbutt of the value of ophthalmoscope in medical diagnosis was an epoch-making advance.

In 1871 he reported to the Pathological Society of London that he had found in the spinal cord in cases of tetanus suppuration extending up the sheaths of the posterior tibial nerves, and he urged neurotomy as a remedy in tetanus. In 1879 he reported his experience with washing out the stomach by a syphon, such as is now used. In 1884 he gave Goulstonian Lectures before the Royal College of Physicians of London on visceral neuroses, which fact was of particular service at that time. His lectures on this subject called a halt

4) H. D. Rolleston: *Sir Thomas Clifford Allbutt*, 1929, pp. 34, 49, 56, 297.

to the vagaries of certain gynecologists who attributed exaggerated importance to uterine displacement. In 1918 he emphasized the importance of the treatment of chronic parenchymatous nephritis by Dr. A. A. Epstein's (of New York) method.

Dr. Allbutt edited a *System of Medicine* and *System of Gynecology* which were the most authoritative works of his generation. His book, *Diseases of the Arteries, including Angina Pectoris* (two volumes, published in 1915), was a classical contribution to this subject.

In 1904 Allbutt published *Notes on the Composition of Scientific Papers* which exercised a profound influence upon medical writers. He advocated first the collection, in a labelled drawer, of material bearing on the chosen subject in the form of cuttings and abstracts. The slips should be clipped together according to the sections or chapters of the intended article and then arranged in their logical sequence, from which the first draft is to be made. In the second draft redundant words and repetitions should be deleted, necessary changes in the order of sentences and paragraphs made, and corresponding modifications added. In the third draft, which is usually the last, the composition should be more critically considered; sentences recast, made to run logically and convey one meaning only; every word separately weighed. The final revision should be done at an interval of a week or two, so that the mind may unconsciously meditate on the subject with refreshed attention.

He was interested in medical life in its various aspects. His numerous lectures, addresses, and writings attempted to raise the requirements of medical education and medical ethics to a high standard. For instance, he succeeded in 1880 in getting a consultation of physicians of both sides in legal cases in order to avoid contradictions of fact in courts.

Allbutt added interesting essays to the history of medicine. His first historical paper, "Medicine of the Greeks", was published in 1866. His essays "Science and Medieval Thought" (1901), "Historical Relations of Medicine and Surgery" (1905), "Byzantine Medicine" (1913), and "Greek Medicine in Rome" (1921) are little masterpieces, "the fruit of sound scholarship set forth in a literary manner of the most pregnant, stimulating and thought-compelling kind."⁵

5) F. H. Garrison: "In Memoriam: Sir Thomas Clifford Allbutt," *Science*, New York, 1925, LXI, 331.

When he died on February 22, 1925, at the age of eighty-nine, he was considered the greatest British physician of his time. His numerous contributions to the science and art of medicine exerted a strong influence on the profession in various aspects. Essentially a scientist, a recreator, educator, a dynamic searcher for the truth, an artist and humanist, he was a model physician and teacher.

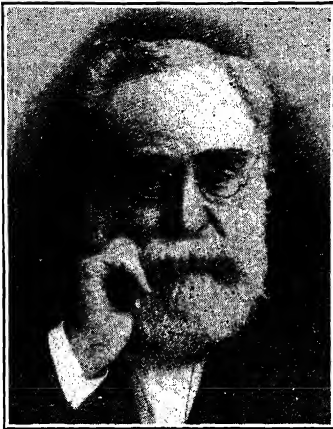
His publications include: "Construction and Degeneration," 1864; "Mental Anxiety as a Cause of Granular Kidneys," 1877; "Remarks on Dilatation of the Stomach and Its Treatment," 1880; "Medical Study and Practice," 1883; and "Science and Medieval Thought," 1901.

The standard biography is Sir Humphry D. Rolleston's book, *The Right Honourable Sir Thomas Clifford Allbutt*, Macmillan & Co., London, 1929. Other works on Allbutt are found in the *Brit. Med. Jour.* (Feb. 28) 1925, 415; Editorial, *Jour. A. M. A.* (Feb. 28) 1925, LXXXXIV, 678-680; *Ibid.*, (March 14) 1925; F. H. Garrison, *History of Medicine*, Phila., 1922, 681-682; *idem.*, Sir Humphry Rolleston's "Life of Allbutt," *Bull. N. Y. Acad. Med.*, 1930, VI, 132-135.

CHAPTER VI

DR. JACOB da SILVA SOLIS-COHEN

(1838-1927)



PROF. JACOB SOLIS-COHEN
(1838-1927)

Greater than the greatest discovery is to keep open the way to further discoveries.

— ABEL

You are well named the Nestor of American Laryngology. Those around you have recognized in you the Scientist, the Patriot, the Humanitarian.

— DR. D. BRYSON DELAVAN

Dr. Jacob Solis-Cohen, father of the literature and organized instruction of laryngology in America, was born in New York City, February 28, 1838. He was a descendant of distinguished Spanish, Portuguese and colonial ancestry. In 1860 he was graduated from the University of Pennsylvania School of Medicine.

In the same year he enlisted as a private in the Union army at the outbreak of the Civil War, and later he became assistant surgeon in the Twenty-sixth Regiment, Pennsylvania Volunteers, serving with this regiment in Hooker's Brigade, first in the defense of Washington and afterward at Bladensburg. In September 1861, he was transferred to the navy, serving as acting assistant surgeon in DuPont's expedition to Port Royal and in the South Atlantic blockading squadron.

In 1866 at the Philadelphia School of Anatomy Dr. Solis-Cohen instituted the first regularly organized lectures in laryngology given in America. The Jefferson Medical College appointed him lecturer on electro-therapeutics in 1867, lecturer on laryngoscopy and diseases of the chest in 1869, and honorary professor of laryngology in 1883. In

the same year he was elected professor of diseases of the throat and chest at the Philadelphia Polyclinic and College for Graduates in Medicine, of which he was one of the founders. In 1871 as Mütter Lecturer to the College of Physicians he delivered a course of lectures on the Surgery of the Air Passages.

MEDICAL CONTRIBUTIONS

In 1867 Dr. Solis-Cohen was made chairman of a committee of the American Medical Association to investigate the value of treatment by means of inhalation. His studies resulted in the publication in 1867 of his first book, *Inhalation in the Treatment of Disease — Its Therapeutics and Practice*. His great work, *Diseases of the Throat and Nasal Passages — A guide to the Diagnosis and Treatment of Affections of the Pharynx, Esophagus, Trachea, Larynx and Nares*, published in 1872, was the first complete exposition of the subject ever written, and as a practical guide was without a rival. No book has ever had a greater influence in disseminating a wide and thorough knowledge of laryngology. In 1874 appeared his monograph on *Croup in Its Relations to Tracheotomy*, based upon a study of over 5000 recorded cases, a work which achieved a remarkable and well-deserved success. He wrote a health primer, *The Throat and the Voice*, in 1879. Dr. Solis-Cohen contributed the chapters on "Disease and Injuries of the Esophagus" to the *International Encyclopedia of Surgery* (1884) and those on "Diseases of the Pharynx" and "Diseases of the Esophagus" to the *American System of the Practice of Medicine* (1885).

In 1867 he performed the first successful operation of cutting into the larynx (laryngotomy) to remove a cancerous growth, an operation a German surgeon advised for the Crown Prince (later Emperor) Frederick, stating after the Emperor's death that had the operation been performed his life would have been saved. In 1892 Solis-Cohen performed the first successful laryngectomy, introducing a number of innovations which are still used. The patient developed a well modulated voice without artificial appliance. Solis-Cohen also contributed many important articles to medical journals, all marked by the originality, the clearness and the scientific accuracy which distinguished him.

While in the highest sense a specialist, he called himself "a physician with a specialty," always stressing the importance of the

association of a well-grounded knowledge of general medicine with that of special medicine, and frequently warning his students not to become "one-eyed specialists." He was the earliest American advocate of the open air treatment for tuberculosis as well as for other conditions; he introduced the Brandt treatment of typhoid fever into the German Hospital (now called Lankenau Hospital); and for some years he supplied gratuitously from his own horses the antitoxin used in Philadelphia.

OTHER ACTIVITIES

Dr. Solis-Cohen's scientific interests were not confined to medicine. He was professor of physiology in the Wagner Institute of Science from 1866 until 1868, and lectured on light, acoustics and other topics there, as well as at the Franklin Institute of Philadelphia in 1870, and at the Stevens Institute of Technology in Hoboken in 1871. In the Academy of Natural Sciences he was one of the early champions of the evolutionary theory. He first demonstrated there Faber's "talking machine," an instrument for reproducing mechanically the sounds of the human voice.

Dr. Solis-Cohen was also great as an organizer and leader. He was one of the founders of the American Laryngological Association in 1878, its president in 1880, and its guiding spirit for many years. He was the founder of the old Philadelphia Laryngological Society in 1880, and its first president (1880-82). He was a co-founder and editor of *The Archives of Laryngology* (1880-83) and for a long period edited the Laryngological Department of *The American Journal of the Medical Sciences*. In recognition of his valuable work, Dr. Solis-Cohen was elected many times to high positions in medical life. He served as president of the Philadelphia County Medical Society (1887-88) and of the Northern Medical Association, Philadelphia (1875), as vice-president of the Pathological Society of Philadelphia, and as treasurer of the Congress of American Physicians and Surgeons. He was honorary member of a number of American and European medical societies. He also belonged to many civil and military organizations outside of his profession. In 1912 the honorary degree of LL.D. was bestowed upon Dr. Solis-Cohen by both the Jefferson Medical College and Temple University.

Dr. Solis-Cohen was recognized as a versatile physician, a dis-

tinguished and inspiring leader in the field of laryngology. By his writings and lectures he paved the way for other investigators, and promoted a wider understanding of throat and respiratory diseases.

Dr. Solis-Cohen devoted his life to the benefit of humanity and to the advancement of laryngology. A great number of his pupils who now occupy high positions as medical teachers, authors and investigators have retained high regard and esteem for their great master.

For one to appreciate Dr. Solis-Cohen's work in laryngology, it must be borne in mind that about sixty years ago specialties were regarded by practitioners with little favor. It is recorded that the earliest laryngologists of the United States were considered by many physicians as semi-charlatans. Dr. Solis-Cohen recalled that he was blackballed at the Academy of Natural Sciences of Philadelphia by a few of the medical members who declared him to be engaged in unethical practice. He also reported in his address before the American Laryngological Association that when the great surgeon Samuel D. Gross introduced him to his class, he criticized him for leaving the ranks of legitimate practice to become engaged in a narrow specialty. "Why," he added, "he devotes most of his time to a cubic inch of the human anatomy. Some day I suppose we will have specialists confining themselves to diseases of the navel!" Nevertheless, Dr. Gross later sent for him to lecture on methods of examining the upper air passages, and invited him to write the chapters on "Surgery and Surgical Diseases of the Air Passages" for his revised edition of *System of Surgery*.¹

Dr. Solis-Cohen was recognized as the greatest diagnostician on laryngology. Some of the outstanding physicians of his time consulted him in obscure cases pertaining to his specialty. The celebrated surgeon Samuel D. Gross on March 22, 1867, wrote to Dr. Solis-Cohen:

My Dear Doctor — I send you this young woman, who has for several months past labored under a spasmodic cough, which has resisted all medication that I have been able to direct for her relief. Do look into her windpipe. My conviction is that she has a Devil in it, or that the girl is bewitched! I have never been so utterly at a loss about the

1) See S. R. Kagan: "Jacob da Silva Solis-Cohen," *Medical Life* (Aug.) 1937, 301-302.

nature and treatment of a case. She has relatives who are well to do, & a beau who is willing to pay. Give me your opinion.

ADDRESSES

Dr. Solis-Cohen was highly esteemed by the profession and, at various dinners and congresses, delivered addresses on divers topics, which gave evidence of his vast knowledge and oratorical ability. On several occasions dinners were held by the medical profession in honor of Dr. Solis-Cohen, and numerous addresses given on these celebrations presented his achievements as a teacher, author, surgeon, pioneer, and man. Thus on March 15, 1910, a testimonial dinner to Dr. Solis-Cohen was given in Philadelphia by the Section on Laryngology of the College of Physicians and by his former assistants in honor of his having completed a half century of active practice. Addresses were given there by Drs. A. W. MacCoy, J. Solis-Cohen, W. L. Rodman, A. W. Watson, C. E. de Sajous, A. A. Bliss, D. B. Kyle, C. P. Grayson, G. Stout, J. T. Rugh, and J. H. Gibb. The toast-master, Dr. MacCoy, delivered the following address:

Honored Guest, Gentlemen:-

. . . Alexander the Great had conquered the known world at the age of thirty, and died three years later of "ennui." Our honored guest, Dr. Cohen, can rightfully claim to have been as valiant a warrior in his younger days as the famed Alexander. He had to subjugate the entire medical world to the acceptance of new methods and to a new science, Laryngology. The world owes an immense debt to Dr. Cohen. As we celebrate his Golden Anniversary in medicine tonight, we can, with one accord, acclaim that he has faithfully kept his troth all these fifty years, to the jealous Goddess to whom he had sworn allegiance. We honor him for his great ability, his far-reaching courage, together with his keen insight into the distant future. Can you younger men realize what entering Laryngology meant to Dr. Cohen's younger days? If you could, I fear many of you would falter and find your courage fail you.

Looking backward it seems to us a long, tedious, and tortuous path Dr. Cohen travelled in the direction of his choice. There was everything to learn, no guideposts, not much companionship, little sympathy, and less interest from the profession. While a student of medicine at the old University, I recalled Dr. Cohen's return from

abroad after studying with Dr. Carl Czermak.² I heard of his advent in Laryngology, and also heard whispered suspicions whether or not his new practice was, or would be, ethical. Can any of you today realize such a ridiculous point of view?

This man's ability and the value of his art made rapid headway. The marvelous revelations reflected in his laryngeal mirror put at rest all doubts as to his skill, and completely demonstrated the art of Laryngoscopy as a valued aid to medicine. Gradually, from his accumulation of facts, co-ordinated with his large experience, he originated a system of practice, expressed finally in his book, — the pioneer work in his country, his "Diseases of the Throat etc." This volume represents a mine of medical wealth, and if we turn to its pages, we can find many of our cherished points of view anticipated.

Many honors came in rapid succession. Each year found him more useful and more prominent in his profession. When I returned to this city in 1880 Dr. Cohen was in the full tide of successful professional efficiency. To Dr. Cohen I am indebted for my first opportunity for study and practice in Laryngology at the Jefferson Medical College. There he was a courteous and valued mentor to me. His industry and skill were an inspiration. I believe Dr. Cohen to be today the cleverest manipulator of the laryngeal mirror that it has been my good fortune to meet. In my judgment, his keen power of observation in the larynx excels that of any living man.

On April 15, 1910, Dr. Solis-Cohen was guest of honor at the annual banquet of the Northern Medical Association of Philadelphia and was presented with fifty half-blown roses. Later in the same year at the annual dinner of the American Laryngological Association held in Washington, Dr. Solis-Cohen was the recipient from the Association of a loving cup in recognition of his distinguished services to laryngology and in commemoration of the Fiftieth Anniversary of his graduation in medicine. The addresses made on this occasion presented colorful features of his charming personality and medical accomplishments. Dr. Solis-Cohen's reply to the presentation address of the Association, delivered by Dr. D. B. Delavan, was of historical interest. Later, in 1918, Dr. Solis-Cohen, full of wit and humor, again

2) On the margin of the typewritten manuscript there is the following written note by Dr. J. Solis-Cohen: "Dr. Cohen had not been abroad at that time, and had not studied with Dr. Czermak or with anyone else. His only instructions were the works of Czermak, Turck, Semeleder, Mackenzie and others. The practical part he had to work out himself. The return from abroad was the return from service in U. S. Navy. — J. S. C."

addressed the same Association. These two addresses have been published by the writer elsewhere.³

The following is a part of Dr. Solis-Cohen's address on specialism in medicine which was prepared for the International Congress of Arts and Science in September, 1904. The address was never published.

LARYNGOLOGY IN RELATION TO GENERAL MEDICINE

In combating diseases of special regions, it must be kept in mind that these diseases differ from diseases in other regions, and from general diseases, chiefly by reason of their locality and their environment; and that consequently they are subject to the same principles in treatment that indicate the proper methods in those other regions and in the system in general. Taken both broadly and comprehensively, these principles may be summed up in three requirements: nutrition; protection; and elimination. In order that a vital organ shall properly perform its function it must be properly nourished; hence nutrition is the primary requisite. In order that a properly nourished organ shall perform its function thoroughly it must be protected from injury both within and without; and in order that an organ properly nourished, and duly protected shall continue to perform its function thoroughly, there is a necessity for elimination of every deleterious ingredient that may have crept in whether from within or from without. Food, water, fresh air, sunshine, cleanliness and the like, furnish the nutrition. Clothing, moderation in work and in indulgence, aseptic agents in healthy conditions, and in the unhealthy (what are known) as antiseptic agents, furnish the protection. Water, various hygienic measures and remedies provide the elimination of deleterious substances. Consequently no practitioner of medicine is competent to practise as an expert in any special department thereof until he has a comprehensive knowledge of the practice of medicine as a whole as that practice was understood before modern requirements suggested the present divisions of labor. Much of the sneering opprobrium to which specialism in medicine has been subjected has been due, and is still due, to the crude efforts and crass ignorance of a class of practitioners who, while probably doing the best they know how to do, by their poor judgment, often render their patients victims of injudicious skill and over self-confidence. One of the greatest problems of to-day is to wipe out this class of practitioners, to have the medical student taught at the fountain-head at which he matriculates, that the realms of specialism are to be avoided until the aspirant be

3) See S. R. Kagan: "Jacob da Silva Solis-Cohen," *Medical Life*, New York (Aug.) 1937, 296-305.

properly prepared by a preliminary practice in general medicine, even though it be of ten years or more duration.

In accordance with an opinion expressed long, long ago, "it is in all probability always a great error for a recent graduate to devote himself to exclusive practice in a special line before he has had considerable experience in general practice." A general practice, with special attention meanwhile to any desired branch, will render the practitioner the far better and more thorough specialist in the long run. There are specialists in the branch under consideration who rarely, if ever, condescend to feel a patient's pulse or in any other way make themselves acquainted with the condition of his general health. Mechanics rather than physicians, their narrow views often restrain them from seeing and foreseeing much that is actually before them, so that they work without regard to conditions of nutrition. Like young microscopists, they must often be told what is on the slide before they are able to recognize it. They will snare or cut away or otherwise remove an obstructing turgescence of a turbinate body, when a smart saline laxative would have purged the tissues of their excess of liquid, or when even a run upstairs from the bottom of the house to the top would have sent blood enough to the patient's heels to lessen the supply to his head and thus restore nasal respiration for the time being.

Then again, ignorance of the relations of the nasal structures and accessories to the structures of the ear, to the structures of the eye, and alas! to the structures of the brain, occasionally leads to the sacrifice of an organ or of a life to injudicious instrumental operation, and occasionally even to injudicious instrumental exploratory investigation. So, too, ignorance of possible sequence to operative interference, engenders neglect in attention after operation, and again organ or life becomes a sacrifice to hemorrhage, to autoseptic infection, or to some unanticipated complication. From these errors the specialist who remains or has been a general practitioner is far more free. He is in the habit of mentally interrogating the entire system of his patients, and of providing for exceptional contingencies, and his errors are more likely to be errors of judgment than errors of ignorance, while in the opposite case, the errors are errors of ignorance as well as errors of judgment.

The following Address, which has never been published, was given by Solis-Cohen in the name of the Jefferson Medical College, the Philadelphia Laryngological Society, and Philadelphia laryngologists and physicians at a reception given to Dr. C. Jackson on June 19, 1917, upon his coming to Philadelphia.

ADDRESS OF WELCOME TO DR. CHEVALIER JACKSON, JUNE 13, 1917

Doctor Chevalier Jackson — Knight of the Bronchoscope! Master Gastroscopist!

To you, who with patient toil, unremitting zeal, deft manipulation, have successfully taught yourself to penetrate deeply and safely into the recesses of the living thorax;

To you, whose cunning searchlights can illumine step by step the dingy mucous membrane of the stomach;

To you, the physicians here assembled to do honor extend a warm and hearty welcome to Philadelphia Medical Comradeship.

Now, with saucier impunity than ever, shall the frisky urchins of our municipality cram their greedy mouths with their diaper-pins, their feeding nipples, their penny whistles, their peanut shells, their pork and chicken bones, their coins of varied size and mintage, their fragments of toy locomotrolleys and periscopic automohydroplanes, and all their motley assortments of miscellaneous hardware and haberdashery; for if we brotherly laryngobronchologists fail to withdraw their foreign bodies, a short cry — "Chevalier Jackson to the Rescue!" may bring succor which shall avert their threatened premature interments.

Professor Jackson, as the Honorary Professor of Laryngology, though long a back number, in Jefferson Medical College, I gladly step to the front to welcome you to the active professorate, secure in the conviction that its efficiency is to be still further enhanced under the charge of so competent a scion of your medical *alma mater*. While the faculty of Jefferson Medical College is to be felicitated upon the acquisition of an exceedingly well equipped colleague of assured international high repute, reciprocally you, too, are to be congratulated on your accession to a galaxy of brilliant Surgeons who have maintained continuous exceptional surgical excellence from the very birth of Jefferson Medical College.

In fulfilling your professional obligations in that College may you command more and more affectionate esteem of your compeers and of your pupils. Your pupils! As a medical Student of sixty years ago I can well appreciate the advantages enjoyed by the medical pupil of today.

He is much less belectured into storing his memory with bits of information for graduating purposes, but under the intelligent guidance of up-to-date educators like yourself, he learns to observe, to reason and to do, to detect what is specious, to discern what is real, and to form his opinions, as far as may be, from facts which he has assimilated, and not, as it were, merely unwrap them from the apron-folds of great authorities, be their wisdom quoted in the amphitheatre or be it recorded in printer's ink.

And now, as an honorary member of the Philadelphia Laryngo-

logical Society, and its living representative at this moment, I welcome you to the various laryngological circles of the city, inviting your active, cordial participation in our emulatory discussions.

Personally, as the earliest exponent of our art in Philadelphia, suffice it to express an ardent wish that your professional affiliation with Jefferson Medical College will remain undisturbed until Father Time strikes the signal; and that your special work continue Philadelphiaed so long as you can with confidence handle your instruments of precision. Philadelphia wants you for keeps — Philadelphia's medicalship wants your flag nailed to her mast.

Chevalier Jackson — as a doctor we have welcomed you to our community, as a professor we have welcomed you to our schools, as a lover of his calling, we welcome you to our hearts. *Salve, frater, Salve.*

PERSONAL TRAITS

Dr. Solis-Cohen was a charming personality, modest and friendly. His kindness to the poor was known as the exceptional character of his services. It is recorded that once he performed tracheotomy for laryngeal diphtheria upon the child of an Irish washerwoman. There was no hospital available and no trained nurse, but the operation was done in the kitchen of the humble home in a back street, and the mother proved a devoted and intelligent assistant, so that the child recovered. Some months later the mother came to see Dr. Solis-Cohen and asked for a bill. He replied that he had no charge; he was paid by the child's recovery.

Dr. Solis-Cohen was gifted in various capacities. In his early years he played various musical instruments. When he began lecturing on sound he took lessons in piano-playing from Charles Jarvis, in order to enlarge and correct his knowledge of music from the practical as well as the scientific point of view. He was a talented singer. By the influence of his friend, the Reverend Isaac Leeser, and by his parents he was imbued with a love for the synagogue ritual and was a master of the Hebrew traditional melodies. His descant upon the beauty of the Hebrew music at the Mikveh Israel Synagogue and his singing passages from psalms of the liturgy in his early years was impressive and inspiring. He was very fond of horses, driving to his office and back to his country home and devoting much of his spare time to riding horseback.

Dr. Solis-Cohen died on December 22, 1927 at Philadelphia.

His funeral was conducted as he wished, in the simplest possible manner, but with the dignity of the ancient ritual. The body, clothed in a white shroud, the head covered with a white cap, a "Tallith" around the shoulders, lay in the plainest of coffins; and over the coffin was draped an American flag sent by the Loyal Legion. This flag had performed the same service for many of his comrades of the Civil War, and will be buried with the last survivor of the organization. Before closing the coffin, the officiating minister, Rev. Leon H. Elmaleh placed upon the eyes some dust from the Holy Land which had been brought to Dr. Solis-Cohen by one of his young friends, recently returned from Palestine. How appropriate the symbolism — fidelity to faith, fidelity to country, fidelity to ancient hopes!

Reviewing the medical accomplishments of Dr. Solis-Cohen we must acknowledge that his rank in medical history is high. He was a prime mover, an original investigator, an artist in his specialty. He was a pioneer in laryngology, and was among the first American surgeons to specialize in diseases of the nose and throat, and to study the use of the laryngoscope. He is one of the brightest stars in the galaxy of American laryngologists.

The bibliography of the writings of Dr. Jacob Solis-Cohen has been given in my "Biography and Bibliography of Jacob da Silva Solis-Cohen," published in *Medical Life*, August, 1937, pp. 307-313. The bibliography contains thirteen books, 111 articles, fourteen editorials and three translations. The following additional titles are herewith listed:

I — WORKS BY J. SOLIS-COHEN

1. "Diseases of the Nose," Supplement to Ziemssen's *Cyclopedia of the Practice of Medicine*, New York, 1881, Wm. Wood & Co., 259-263.
2. "Diseases of the Pharynx," *Ibid.*, 264-267.

II — TRANSLATIONS BY J. SOLIS-COHEN

1. "Diseases of the Trachea and Bronchi," Ziemssen's *Cyclopedia of the Practice of Medicine*, New York, 1876, IV, 275-586.
2. "Diseases of the Lips and Cavity of the Mouth," *Ibid.*, 733-860.
3. "Diseases of the Soft Palate," *Ibid.*, VI, 863-994.
4. "Diseases of the Naso-Pharyngeal Cavity and Pharynx," *Ibid.*, VII, 3-108.

The main source of biographical information is S. R. Kagan's monograph, "Jacob da Silva Solis-Cohen," *Medical Life*, New York (Aug.) 1937, 291-313. Other sources are: *Jewish Exponent* (Dec. 30) 1927; *Tr. Coll. Phys.*, Phila., 1893, V, 191-197; *Tr. Am. Laryng. A.*, Jubilee Celebration, N. Y., 1918, XL, 131; G. Blumer, *Dict. Amer. Biog.*, 1930, IV, 275; S. R. Kagan, *Jewish Contributions to Medicine in America*, Boston, 1939, 267-269, 524-529, Notes No. 1.

CHAPTER VII

DR. JOHN SHAW BILLINGS

(1838-1913)

Books are the tools with which we work.
They belong to every calling. Without
them we cease to grow, and our pupils
perish for want of knowledge and vision.

— CHARLES P. WILES

Books are the most important tools of
our craft when assembled in mass in our
great medical libraries.

— HARVEY CUSHING

Dr. John Shaw Billings was a prime-mover in American medicine. His life, not devoid of romance, was a remarkable example of varied ability, interests and actions. He was great as a librarian, bibliographer, medical historian, author, teacher, organizer and administrator. He possessed a charming and impressive personality, a "mighty mind" and an inexhaustive energy. He accomplished much in the fields of bibliography, librarianship, medical education and history, hospital construction, vital statistics and public health. He was a successful warrior because of wide, clear vision, sincerity, honesty, energy, persistence and wisdom. He said: "There is four hundred times more learning in the world than wisdom." He used to say that it is only necessary to make a good beginning, like the coral insects, and the rest will upbuild itself in good order.¹ Skill and wisdom is discernible in each phase of his military and civil activities.

1838-1861

Billings was born at Cotton Township, Indiana, on April 12, 1838. His childhood was spent on a farm in Rhode Island. His early educa-

1) See S. R. Kagan: *Life and Letters of Fielding H. Garrison*, Boston, 1938, 104.

tion was self directed and he remained an omnivorous reader throughout his life. He had a hard time getting his college education. For a half year while in college he lived on seventy-five cents a week. This period of semi-starvation was injurious to him, but his love for knowledge overpowered his unfavorable economic condition. Billings was graduated from the Medical College of Ohio in 1860. He prepared a thesis for his doctorate on "The Surgical Treatment of Epilepsy" and found that there was not an efficient medical library in North America. This deficiency prompted him later to encourage the development of the Library of the Surgeon-General's Office at Washington. After graduation he became demonstrator in anatomy at his alma mater.

1862-1895

When the Civil War started in 1861 Billings applied for commission in the Medical Department of the Regular Army. He passed first in the group of candidates and was appointed assistant surgeon on April 16, 1862. He attracted the attention of his superiors and was in command of various important military hospital work.² In 1864 he was transferred to the Surgeon-General's Office in the War Department, Washington, D. C., where he remained for thirty years. As an army surgeon he was familiar with the construction of the army hospitals. His creative power and practicability made him an expert in the matter of hospital building and management. At the request of the Secretary of the Treasury, Billings undertook the survey of the hospitals supervised by the Marine Hospital Service. In 1870 he reorganized this institution and increased its functions. In 1912 the Marine Hospital Service became known as the United States Public Health Service. Later Billings became the advisor of the construction of the Johns Hopkins Hospital as well as other hospitals in the country. Under his supervision the Barnes Hospital in Washington was erected. According to Billings' plan, the Johns Hopkins Hospital was built in the "pavilion" style, an outgrowth of the system of separated wards. Welch said of Billings: "He was the greatest authority on everything relating to sanitation, hospital construction, heating and ventilation."

Professor James J. Walsh writes me that he remembers that hos-

2) See E. E. Hume: "John Shaw Billings as an Army Medical Officer," *Bull. Inst. Hist. Med.* (Apr.) 1938, VI, 225-263.

pitals fifty years ago were by no means the highly specialized community edifices that they are at the present time. He recalls that someone told him that probably the greatest authority on hospitals half a century ago was Billings, and it was said of him: "If you gave Billings ten million dollars and the state of Texas, he would probably create a hospital that would satisfy him." These requirements do not seem so unreasonable in the light of modern hospital construction trends, particularly in our large cities.

Significant were Billings' plans and specifications for the Johns Hopkins School and Hospital. He advised that "the seal of its diploma should be a graduate that its possessor is not only a well educated physician in the fullest sense of the word but that he has learned to think and investigate for himself, and is therefore prepared to undertake, without danger of failure from not knowing how to begin, the study of some of the problems still awaiting solution."³ With regard to the Medical School he emphasized the idea that this school should be in a position to do something different from the other medical schools of the United States by its high standard. It should attempt to train men to be original research workers since that subject did not get consideration in the other medical schools existing in the country at that time.⁴

The most important accomplishment by Billings was his work in helping the growth of the Library of the Surgeon General's Office and the edition of its *Index Catalogue*. The Library, which since 1922 has been known as the Army Medical Library, was founded by the Surgeon General Hammond in 1862. When Billings was assigned in 1864 to the duty of the Surgeon-General's Office its Library numbered 2253 volumes. Due to his efforts it became the greatest medical library in the world, having at present about 410,000 books, 600,000 pamphlets, 150 manuscripts, 450 medical incunabula, 10,000 portraits, many hundreds of autograph letters, a photographic reference collection of about 10,000, a statistical library (medical) of 40,000 volumes, a collection of medico-military works, and a legal medicine collection of about 1500.⁵

3) See F. H. Garrison: *History of Medicine*, Phila., 1922, 783.

4) See A. M. Chesney: "John Shaw Billings and the Johns Hopkins Medical School," *Bull. Inst. Med. Hist.* (Apr.) 1938, VI, 274-275.

5) Col. H. W. Jones, librarian, Army Medical Library: Personal communication to the author.

Billings devoted much time and energy to the publication of a medical bibliography, the *Index Catalogue*, which required much knowledge and great financial aid. Billings' wisdom and high reputation helped him to compile a brilliant catalogue and to get the appropriation for this purpose. In connection with this, it is of interest to quote excerpts from his correspondence with Dr. Abraham Jacobi, who was largely responsible for the success of the undertaking. On April 16, 1876, Billings wrote to Jacobi:

"I send you today a specimen of a Catalogue. Will you do me the special favor to look over it with some care, and then tell me how you like it, which of the three or four styles you prefer, and point out improvements. I should be much pleased also if Mrs. Jacobi would give me her criticisms. It is mainly for the use of such people as you that I have tried to get the thing into shape, and if it ever is to be printed, I want it to be made as nearly satisfactory as possible — entirely it can never be."

On June 20, 1878, Billings wrote to Jacobi:

"Congress has adjourned without authorizing the printing of the Catalogue. . . . Will you not consider your Committee as still existing and have Messrs. Hewitt, Eickhoff, and other New York members impressed with the fact that their medical constituents *really* want this thing, and that their request is not merely *pro forma* to oblige the Surgeon-General or myself but is for their own pleasure and profit. I am writing all over the country about this — May I leave the matter in your hands?"

Again on March 4, 1879, Billings wrote to Jacobi:

"The Catalogue appropriation *has passed* and we are authorized to print the first two vols. This is largely due to a letter which you wrote to Mr. Eickhoff — a letter which kept the printing Committee from being hostile actively although they would not report favorably — probably on account of Homeopathic opposition."⁶

The first volume of the *Index Catalogue* was edited by Billings with the assistance of Fletcher, while the first series of the *Index Medicus* was edited jointly by Billings and Fletcher. Both of these publications, according to George Adami, are "America's greatest gift

6) See V. Robinson: "The Life of A. Jacobi," *Medical Life* (May and June) 1928, 243, 269.

to Medicine." William Osler remarked that the medical profession of the United States is indebted to Dr. Billings' energy and perseverance for one of the greatest collections of medical books in the world, and that the *Index Catalogue* constitutes Billings' best "float through posterity." William H. Welch stated that "The *Index Catalogue* is probably the most important contribution yet made to American medicine." Fielding H. Garrison said that "Billings did a giant's work for the advancement of American medicine." Sir Humphry Rolleston wrote that as a bibliographer Billings has been compared with the encyclopedic Albrecht Haller. Sir Humphry further asserted that the transformation of medicine in America during the last twenty years of the nineteenth century and after was due to several factors: among others to the men of Billings' generation, especially Welch and Osler, to the example set by the Johns Hopkins University and Hospital, and to the offspring of Billings' energetic initiative:— the library of the Surgeon-General's Office, its *Index Catalogue* and the *Index Medicus*.⁷

Billings' methods in the Catalogues were followed by his collaborators and successors, Dr. R. Fletcher, Dr. F. H. Garrison and Dr. A. Allemann. After the death of Billings attempts were made to modify some rules of his system in the *Index Catalogue*, but his best pupil, F. H. Garrison, interfered and retained the principles originated by his teacher.⁸

Billings, like Welch, was among the first American physicians who had frequent contact with European medical leaders. Billings and Welch helped greatly to elevate the prestige and emancipation of American medicine because they were highly regarded by the great European physicians and were prime-movers of American medicine. At the seventh meeting of the International Medical Congress, held in London in 1881, Billings, as a representative from America, was invited to give an address. This was the first time American medicine had been officially recognized by European authorities. Billings' address, "On Medical Literature", was a masterpiece. Dr. Jacobi in a letter to F. H. Garrison wrote of this incident as follows: "The first overwhelming impression he [Billings] made upon me, dated from 1881. He delivered the address before the London International Medical Congress

7) H. Rolleston: *Medical Record*, New York, 1937, CVL, 45.

8) See S. R. Kagan: *Life and Letters of Fielding H. Garrison*, Boston, 1938, 47-48; A. Allemann, personal communication.

... he kept the large audience sometimes in the silence of rapt attention, other times in roars of laughter."

Billings was also an authority on medical history and hygiene. He lectured on the history of medicine at the Johns Hopkins University. He was visiting professor of hygiene at the University of Pennsylvania. His publications on medical history, medical education, and public health are remarkable because of their originality, versatility, and depth of thought. Among his notable works are "The National Medical Dictionary" (1890), "American Inventions and Discoveries in Medicine, Surgery and Practical Sanitation" (1891), and "Ideals of Medical Education" (1891). Billings' work "A Century of American Medicine, 1776-1876; Literature and Institutions" was an antecedent of Abraham Flexner's Report on the Carnegie Foundation for the Advancement of Teaching on "Medical Education in the United States and Canada" (Rolleston). Billings also made researches in the field of microscopy, photomicrography and comparative anatomy.⁹

Billings was an encyclopedic scholar. According to F. H. Garrison, Billings "achieved excellence and gained distinction" in six fields. Of significance also were Billings' activities in the fields of vital statistics and public health. He was in charge of the vital statistics of the federal censuses of 1880 and 1890. Due to his efforts medical data has been included in the census since 1880. He introduced corrected death rates and life tablets for unselected populations. He was the first to suggest the mechanical methods of tabulation.¹⁰ Welch said of Billings that "he was the greatest vital statistician this country has produced."¹¹

Billings was gifted in determining accurately the ability and character of men. On Billings' recommendation R. Fletcher, F. H. Garrison, and W. Reed were appointed to positions in the Library of the Surgeon-General's Office. It was Billings who recommended W. H. Welch and approved Wm. Osler and W. S. Halsted to appointments in Johns Hopkins Hospital. While serving in the Civil War Billings met a young surgeon, Dr. Morris J. Asch, and described him as a capable

9) See F. H. Garrison: "The Scientific Work of John Shaw Billings," *Biog. Mem. Nat. Acad. Sc.*, Washington, D. C., 1917, VIII, 385-416.

10) W. F. Willcox: "Billings, John Shaw," *Dict. Am. Biog.*, N. Y., 1929, II, 268; *idem.*, "John Shaw Billings and Federal Statistics," *Am. Statistical Asso. J.*, 1926, XXI, 257-266.

11) *Bull. Johns Hopkins Hosp.*, 1914, XXV, 252.

and gifted surgeon. Dr. Asch later became professor of laryngology at the New York Polyclinic and discovered the "Asch operation" for deviation of the nasal septum.¹²

Billings' ability was recognized by many organizations and institutions, and he was elected to many high positions. He was vice-president of the National Board of Health (1879-82), original member of the American Public Health Association (founded in 1872) and its president in 1880, and chairman of the Board of the Trustees of the Carnegie Institution of Washington.

Billings was modest and consulted other authorities on subjects on which he was an authority himself. Thus, on September 28, 1879, he wrote to A. Jacobi: ". . . I want to bring Mr. King of Baltimore to see you to talk about the proper organization of a children's sanitarium, he being trustee of a fund of \$500,000.00 recently bequested for that purpose. Mr. King is a Quaker — and the President of the Hopkins Hospital. I have told him that I thought of the matter and that you were the best adviser for him to consult."¹³

Billings' letters were distinguished by simplicity, clarity and brevity. The content of his moderate correspondence was of a practical nature and dealt mainly with the Library, catalogues, medical education and sanitation. Several selected letters of Billings addressed to Fielding H. Garrison are given herewith.

I

425 Lafayette Street, N. Y. City

My dear Garrison, I have your note of yesterday, for which, and for the two copies of your paper, please accept my thanks. I think the sketch a good one — and appreciate your kind references to myself. I have a copy of Dr. Allemann's paper. With kind regards,

Yours sincerely, J. S. BILLINGS

Oct. 17/06

12) See S. R. Kagan: *Jewish Contributions to Medicine in America*, Boston, 1939, 16, 557.

13) See "The Life of A. Jacobi," by V. Robinson, *Medical Life*, (May) 1928, 243.

II

425 Lafayette Street, New York
November 20, 1909

Dr. Fielding H. Garrison,
Washington, D. C.

Dear Sir:

I have received the copies of your monographs "Physiology and the Second Law of Thermodynamics" and "Josiah Willard Gibbs and His Relation to Modern Science," which you have kindly sent me, for which please accept my thanks.

Very truly yours,
J. S. BILLINGS

I did not know you were working on these lines. It is very interesting.
J S B

III

New York, Nov. 9, 1912

My dear Dr. Garrison:

I have just heard with great sorrow of the death of Dr. Fletcher. Will you please read the enclosed note to Eeu't Matile, seal it and send it to him. I do not know his address. I am very sorry that I cannot go to his funeral. I hope to be in Washington about the 20th inst. when I shall see you. With kindest regards, sincerely yours,

J. S. BILLINGS

IV

THE NEW YORK PUBLIC LIBRARY
476 Fifth Avenue

February 8, 1913

My dear Doctor Garrison:—

I have your note of the 5th, enclosing the manuscript of your obituary of Dr. Fletcher for the *Index Medicus*. I have read this over with care and think it is admirable and I have no alterations or suggestions to offer. Very sincerely yours,

J. S. BILLINGS

enc

1896-1913

Billings' versatility and skill are evidenced also in his achievements in the New York Public Library. In 1896 Billings became director of the New York Public Library. He combined the Astor

Library, the Lenox Library, and Tilden Foundation into an harmonious unit. He began a systematic recataloguing of the entire collection of books on a uniform plan, making an author catalogue for official use, and an index catalogue of authors and subjects alphabetically, a "dictionary catalogue" for public use. Billings helped in the plans for construction of the present New York Public Library.¹⁴

Billings possessed all the qualifications of a leader — knowledge, experience, self-confidence, sagacity, and personality. As a result of his altruism, he won recognition as a first rank leader in several fields. Possessing a strong will and health, he never failed in his endeavors. An excellent disciplinarian, he had the power of imposing his will on others, sometimes employing the Napoleonic trait of simulating anger. He adhered to definite rules and systems in his enterprises. When Osler, his close friend, once lost a book taken from the Library of the Surgeon-General's Office, Billings punished him by depriving his rights of taking books from this library for a period of one year. Billings' imperative personality, however, did not arouse antagonism among his subordinates as they knew his sincerity and idealistic devotion to his work.

Dr. Billings died on March 11, 1913, and was buried with military honors in Arlington National Cemetery. In the same cemetery are buried his associates, Dr. Robert Fletcher and Dr. Fielding H. Garrison. The names of this "big trio" will go down in American history as pioneers in medical bibliography.

Billings' activities were highly praised by the American and European profession. In 1895 a testimonial banquet to John S. Billings was held in Philadelphia. S. Weir Mitchell presented the guest of honor with a silver box containing a check for \$10,000.00 from 259 physicians of the United States and Great Britain "in grateful recognition of his services to medical scholars."

Among other great authorities who praised Billings highly was Dr. Halsted, who said that "Billings was too great a man to be fully appreciated in his time."

In April 1938, on the occasion of the hundreth anniversary of

14) F. H. Garrison: *John Shaw Billings, A Memoir*, New York and London, 1915, 259; H. M. Lydenberg: *American Library Pioneers*, I; *idem.*, "John Shaw Billings and the New York Public Library," *Bull. Inst. Hist. Med.* (Apr.) 1938, 381; *Hist. New York Pub. Library*, published by the Library, 1923.

Billings' birthday, the *Bulletin of the Institute of the History of Medicine* and the *Bulletin of the Johns Hopkins Hospital* edited a special Billings Number in commemoration of the great American medical pioneer, leader and organizer — John Shaw Billings.

At the Memorial Meeting of the New York Academy of Medicine, Dr. A. Jacobi read the following eulogy of Dr. J. S. Billings: "Billings was so prominent in many fields of knowledge, research, and activities that each of them would have secured his immortality both in medical and general history. . . . It is in him that the combination of American idealism and creative constructiveness is best represented, as an example to be emulated by all men, both great and small, in all countries."¹⁵

Billings was a self-made man. In his boyhood and college life he did not come in contact with great men who influenced his mental power or who contributed to the development of his love for science and books. He was a man of dynamic nature, of initiative and industry, and set an example of hard and honest labor. His philosophy was that regardless of the difficulty of an undertaking, once a good beginning was made with self-confidence, progress was assured. He was a man of creative impulse, and he made an everlasting place for himself in American medicine.

The most authoritative biography is Dr. F. H. Garrison's book, *John Shaw Billings, A Memoir*, N. Y., 1915, which contains also the bibliography of the writings of Billings. Other biographical sources are: Wm. Osler's "John Shaw Billings," *Canada Med. Ass. J.*, Toronto, 1913, 613-616; H. M. Lydenberg, *John Shaw Billings*, N. Y., 1924; J. E. Mears, *Memoir of John Shaw Billings*, M. D., 1913; "John Shaw Billings Memorial Number," *Bull. Inst. Hist. Med.*, Baltimore (Apr.) 1938, VI, 223-386; *ibid.*, (May) 1938, 387-398; S. Weir Mitchell, et al., *Bull. N. Y. Public Library*, 1913, XVII, 511-535; F. H. Garrison, "In Memoriam: Dr. John Shaw Billings," *Index Medicus*, No. 3, 2nd ser. (Mar.) 1913, XI, 381-384; *idem.*, *Mill. Surg.*, 1927, LXI, 61-64; *idem.*, "Billings: A Maker of American Medicine," *Lectures on History of Medicine*, Phila., 1933, 187-200.

15) *Ann. Med. Hist.*, New York, 1917, I, 109-110.

CHAPTER VIII

DR. JULIUS COHNHEIM

(1839-1884)

Observation is a passive science, experimentation an active science.

— CLAUDE BERNARD

We measure genius by quality, not by quantity.

— WENDELL PHILLIPS

Dr. Julius Cohnheim was born in Demmin, Pomerania, July 20, 1839. He studied medicine at the Universities of Würzburg, Marburg, Greifswald and Berlin, and from the latter he received his diploma of Doctor of Medicine in 1861. Then he took a postgraduate course in Prague, and in 1862 returned to Berlin where he practiced medicine until 1864. After serving as a Prussian army surgeon in the Austrian War (1864-65), he became an assistant in the Pathological Institute of the University of Berlin under Virchow (1865-68). In 1868 Cohnheim was elected professor of pathological anatomy and general pathology at the University of Kiel (1868-72) and in 1872 he occupied a similar position at the University of Breslau (1872-78). During the winter of 1873-74 his work was interrupted by a severe illness. When Rokitsansky died in 1878, Cohnheim was called to Vienna as his successor, but Cohnheim's sickness prevented his acceptance of the offer. In 1878 he became professor of pathology at the University of Leipzig (1878-84).

Cohnheim was born of Jewish parents with limited means, and his boyhood was full of struggles. It was due to the self-sacrificing devotion of his intelligent and energetic mother that he got a university education. In 1856 he started his medical training at the University of Berlin. When he came to Würzburg, he became acquainted with H. Immermann who described Cohnheim "as a bright and jovial

student, full of drollery, and gifted with an extraordinary power of telling a good story well."¹ Cohnheim had many interests in life, but he devoted most of his time to scientific studies. He was influenced by some of his teachers and friends in his work. Thus, Virchow influenced his pathologo-anatomical studies; Ludwig Traube, his life work; Koelliker, his histological investigations; Kühne, his physiologico-chemical work. Koch's discovery of bacteriological culture method and Weigert's discovery of staining bacteria stimulated Cohnheim's studies of the role of bacteria in certain diseases.

When his father died suddenly in 1862, it became necessary that he, the eldest son, should support his family. About this time, he worked under Professor Ludwig Traube to whose memory Cohnheim dedicated his *Lectures*. Knowing that unfavorable circumstances might compel him to give up research work and to start general medical practice, he widened his clinical knowledge and experience under Traube and at the same time learned thoroughly the physiological and experimental methods of that great master. A. B. McKee wrote that Traube and Virchow in fact influenced the scientific work of Cohnheim more than any other teachers.

In 1864, while Cohnheim served as surgeon with the Prussian Army, his younger brother, Albert, was shot during the victorious passage to Alsen. Cohnheim was extremely depressed by these shocks. Surrounded by sympathetic friends he followed their advice and embraced the Christian faith. The practice of medicine as a career did not attract him, and he chose the way of research work and teaching. His early scientific work soon won him recognition, and he achieved the opportunity to reach his goal in life. He became one of the greatest teachers of pathology of his time.

In 1872 Cohnheim wed Miss Martha Lewald to whom he owed much in his happy married life. She showed sympathy and devotion during many years of severe illness. Two sons were born to him in Breslau. One of them, Dr. Otto Kestner (Cohnheim), born in 1873, and elected professor at Hamburg University, was the author of original work on chemistry of protein (1911), physiology of digestion and nutrition (1908), and physiology of nutrition (1928).²

1) See A. B. McKee: *Memoir*, in *Lectures of General Pathology*, by Julius Cohnheim, London, 1889, p. ix; see also Cohnheim's biography by W. Kühne, in *Gesammelte Abhandlungen*, edited by E. Wagner, 1885.

2) I. Fischer: *Biog. Lexikon*, Berlin and Vienna, 1932, 1, 755.

Cohnheim was kind, modest, cheerful, and fairminded and a possessor of a dignified personality. He had a robust appearance, an ingenious mind, and an energetic faculty. He was an eloquent and fluent lecturer, but no lover of rhetoric; his lectures were lacking in Trousseau's charm, but they were distinguished by clarity and accuracy, and at times by sharp wit and sarcasm. His style was simple, often conversational. He had the ability of recognizing talented and able men, and helped them with his advice. He was beloved by his pupils and collaborators, patronizing young and old students, and encouraging them to do research work under his own discerning eye. Those who thus benefited by his training spread his teaching and technic over the world. In this way he founded Cohnheim's school.

Carl Weigert said of Julius Cohnheim that "the crumbs from the master's table were rich enough to furnish ample material for countless scientific feasts." Sir William Osler wrote that "Cohnheim was the most brilliant pathologist of his day."³ Cohnheim stimulated the work of his famed pupils Stenftleben, Lasser, Salomonsen, Lichtheim, Weigert, Ehrlich, Welch, Neiser, Heidenhain, Ray and Councilman. Under Cohnheim's stimulus, Ottomar Rosenbach (1851-1907) produced artificial valvular diseases in 1878. When Koch needed encouragement it was the botanist Cohn and the pathologist Cohnheim who recognized his epoch-making findings. In 1876 Koch demonstrated at the Botanical Institute in Breslau his culture method of anthrax bacillus, and Cohnheim, who was present there, made the statement that Koch would surpass all others in this field. Through Cohnheim's influence, Koch was appointed to a vacancy in the Imperial Health Department in 1880. It was Cohnheim who recommended William H. Welch to the position of professor of pathology at the Johns Hopkins University.

Cohnheim was the most eminent pupil of Virchow and won international reputation as a pioneer in experimental histology and pathology. During his short life he accomplished much. At the age of twenty-two he presented his inaugural dissertation on the inflammation of serous membranes (1861), which attracted considerable attention. In 1862 under Willy Kühne, Cohnheim made important investigations on the sugar-forming ferments of the salivary glands and pan-

3) Wm. Osler: "Israel and Medicine," *Menorah Jour.*, N. Y. (June) 1915, I, 148.

creas. Cohnheim introduced the method of freezing fresh preparations in microscopical research work. His method of frozen section is universally accepted, and is of value in the diagnosis of malignancy. He first demonstrated the nerve-endings in muscles by means of silver salts, and discovered the mosaic fields (Cohnheim's areas) in cross-sections of striated muscles (1863-65). He first used successfully his gold salts method in his studies of the sensory nerve-endings in the cornea (1867).

During the period of Cohnheim's connection with the Pathological Institute in Berlin, his work was devoted to physiological chemistry and histology. In 1867 he turned to pathological anatomy. His essay, "Ueber Entzündung und Eiterung", was published in Virchow's *Archiv* in 1867, and he continued to publish monographs on inflammation and suppuration until 1873. His studies on this subject revolutionized pathology. As is known, Virchow stated that no difference exists between white blood-cells and pus-corpuscles, and that there can be no diapedesis of blood cells. Cohnheim proved that the pus with the cells contained in it is driven from the blood. He traced by experiments the direct migration of the stained leukocytes to a center of inflammation in the cornea. In this way he was able to demonstrate the essential feature of inflammation in the passage of the white blood cells through the walls of the capillaries, and that pus is formed in this way from the blood. On this basis he formed his theory of inflammation which was universally accepted.

In 1872 Cohnheim published a paper on the relation of the terminal arteries to embolic processes. He advanced the knowledge of pathological circulation and contributed to understanding the etiology of blood clots. He attributed the results of arterial obstruction to anatomical disposition of the vessels, to the presence or absence of an adequate collateral circulation beyond the seat of obstruction. His work on the pathology of the circulation and on the etiology of embolism marked a new departure in the methods of medical therapy.⁴

Among Cohnheim's achievements are original studies of abscesses in amyloid degenerative organs, the minute anatomy of striated muscles, the pathological anatomy of trichinosis, connective tissue corpuscles in inflammation, embolism, venous occlusion, circulation of

4) See F. T. Haneman: *Jewish Encyclopedia*, New York and London, 1930, IV, 163.

the kidney, and the occlusion of a branch of the cardiac coronaries. His observation of a case of congenital myo-sarcoma of the kidney brought him the conception of the embryonic theory of tumors.⁵ In 1876 he made one of the first histologic subdivisions for thyroid cancer.

Together with Dr. Bernard Fränkel, he investigated the communicability of tuberculosis to animals. Of significance was Cohnheim's work in inoculation of tuberculous material in the anterior chamber of the rabbit's eye in 1877. This experiment confirmed and extended Villemin's observation in 1865 and cleared the way for Koch's discovery of the bacillus tuberculosis. Cohnheim's standard book, *Lectures on General Pathology* (1877-80) was generally accepted and considered the most authoritative work on this subject. His pupils followed his foot-steps, and later became great teachers and brilliant researchers.

While living in Leipzig his chronic gout developed severe complications. He, however, did not give up his position as a teacher and researcher. He used to go to Wiesbaden for treatment but continued with his work. In 1884 he attempted to resume his lectures, but since he was unable to walk up the steps, he had to be carried into the theatre. However, his strength failed him, and his remarkable lectures and inspiring researches ended suddenly. He died on August 15, 1884, at the age of forty-five at the height of his intellectual powers. He lies in the Friedhof at Leipzig, in the part reserved for the University. A noble monument has been erected to his memory by friends and disciples. It presents with impressive poetic fervor and with touching pathos the untimely termination of his useful life.

The main source of biographical data is A. B. McKee's *Memoir*, in *Lectures on General Pathology*, by Julius Cohnheim, London, 1899, Sect. 1, pp. IX-XV. Other sources are: J. Pagel, *Biog. Lexikon*, Berlin and Vienna, 1901, 338-340; A. Hirsch, *Biog. Lexikon*, Berlin and Vienna, 1930, II, 66-67; C. Weigert, "Julius Cohnheim," *Berliner Klin. Wchnsch.*, 1884, XXI, 35; F. H. Garrison, *History of Medicine*, Phila., 1922, 616-617; E. Ebstein, *Aerzte-Memoiren*, Berlin, 1923; E. Ponfick, *Gedächtnisrede auf Cohnheim*, Breslau, 1884; P. de Kruif, *Microbe Hunters*, N. Y., 1926; E. R. Long, *The History of Pathology*, Baltimore, 1928; M. G. Seelig, *Medicine in Historical Outline*, Baltimore, 1925.

5) See Wm. Osler: "Cohnheim's Theory of Tumors," *Canada M. and S. Jour.*, Montreal, 1878-79, vii, 337-347, 398-408.

CHAPTER IX

DR. CARL WEIGERT

(1849-1904)

The principle part of everything is the beginning.

— LAW MAXIM

The introduction of noble inventions seems to hold by far the most excellent place among human actions.

— BACON

Carl Weigert was born in Münsterberg, Silesia, on March 19, 1849. He studied medicine at the universities of Breslau and Berlin, receiving from the latter institution his medical degree in 1868. As a student he was influenced by his teachers Ferdinand Cohn, Heidenhain, Traube, Virchow, and Waldeyer. After graduation he became assistant to Waldeyer in Breslau (1868-70). During the Franco-Prussian War Weigert served as regimental surgeon. On his return to Breslau he became assistant in the Medical Clinic to Lebert (1871-74). During the years of 1871 to 1872 a smallpox epidemic broke out in Breslau, and Weigert made extensive research on this subject and published his first important work. This original publication attracted the attention of Julius Cohnheim, who appointed him in 1874 as his first assistant and instructor in pathology at the University of Breslau. Cohnheim was then already handicapped with a severe form of gout, and he left the routine work in the Institute and in the autopsy-room to Weigert. Under Cohnheim's guidance, Weigert developed into a great pathologist of superior technic, but did not follow Cohnheim's methods of experimental pathology partially because he had an aversion to animal experimentation.

In 1878 Cohnheim accepted the professorship of pathology at Leipzig with the condition that his assistant Weigert go with him. The coming of these two great teachers began a new epoch at the

University of Leipzig. In 1879 Weigert became extraordinary professor at this institution. Cohnheim's sickness caused the bulk of his work and teaching to be carried out by Weigert. When Cohnheim died in 1884, Weigert was the logical successor, but this promotion was denied him, because he was a Jew and would not change his faith. Lichtheim tells that Leipzig wanted Koch as Cohnheim's successor. Koch was inclined to accept the offer on the condition that Weigert would be placed as the head of the department of pathology and he himself would take charge of bacteriology, but Berlin did not let Koch go. This was a crisis for Weigert. He could not with his self-respect remain as assistant at Leipzig. His friends, a number of physicians in Frankfurt-on-Main, succeeded in getting him a position as director of Senckenberg Institute for Pathological Anatomy and as pathologist for the Frankfurt hospitals. There he continued his research work until his death. He was very grateful to the Frankfurt physicians for befriending him in his need. Due to his high reputation the Senckenberg Institute became famous as a research center, where students from all countries sought knowledge and skilled technic; and then, they spread the influence of his genius everywhere.

Weigert was a genius endowed with foresight and perseverance. He made many important additions to medicine, some of which are so incorporated in common knowledge that our indebtedness in this respect is forgotten. He was the author of ninety-seven publications, including studies of small pox (1871-75), cell proliferation on external stimulus (1873-96), nephritis (1879), coagulation-necrosis (1880), tuberculosis of veins and its relation to miliary tuberculosis, differential staining of the nervous system (1882), and of human neuroglia (1890-95).¹ He was the first to stain bacteria and devised new methods of staining tissues. Many medical discoveries and theories were made by numerous investigators on the basis of his inventions and statements. Thus, Ehrlich developed his side-chain theory of immunity upon Weigert's conception of partial cell necrosis and the excessive repair proliferation. Weigert pointed out that frequently it is advisable to treat the stained preparation with a dilute acid before washing it with alcohol. This is the principle of differentiation by

1) F. T. Haneman: *Jewish Encyclopedia*, New York, 1905, VII, 482-483; E. Epstein: *Aerzte-Memoiren*, Berlin, 1923, 383, 387.

decolorization; Gram's method is based directly on it, as is also the "acid-fast" phenomenon of bacteria, which was established by Ehrlich in the staining of tubercle bacilli. Through his manifold and fruitful labors he set an example of clearness in presentation and depth in thought. With his brilliant mind that ran on large lines he saw a subject in all its aspects. His work served as a stimulus for vigorous research.

Weigert won international reputation as an outstanding pathologist and teacher. However, he never received a call to a German university. The only honors given to him in his native country were an honorary membership in the Institute for Experimental Therapy under Ehrlich's directorship, an appointment as medical privy counselor, and Geh. Medicinalrat (1899).

Weigert was highly valued by Waldeyer, Cohnheim, Koch, and Ehrlich. Medical authorities looked upon him as a pathfinder in medicine. A great number of his pupils, associates, and friends highly esteemed him and had great affection for their revered master. A short time before his death his friends began to plan the publication of his collected work in commemoration of his sixtieth birthday. Two years after his death, Robert Rieder, his former pupil, published Weigert's collected writings under the title *Gesammelte Abhandlungen*, which contains ninety-seven of Weigert's papers.

Weigert worked energetically to the very end. He was happy of the chance to visit the United States in the summer of 1904, where he was supposed to lecture before the Johns Hopkins University, but his sudden death prevented his plan. Dr. Hyman Morrison wrote: "The great stir created in Frankfurt by the sudden death of Weigert was testimony of how highly he was regarded by the entire community. He was esteemed for his scientific attainment and also for his genial, cheerful, loveable nature, for his modesty and contentedness and for his utter lack of selfishness."²

There is a remarkable resemblance in the lives and work of Weigert and Ehrlich, who were near relatives. Both were natives of Silesia and spent their last period of life in Frankfurt-on-Main. Both had the same virtues: equanimity, serenity, modesty and simplicity. Both were of limited resources and had to struggle hard for their "pleas-

2) H. Morrison: "Carl Weigert," *Ann. Med. Hist.*, New York, 1924, VI, 168.

ure" of doing research work, which was the goal of their lives. Both accomplished much in medical science for the benefit of mankind, although for some time they worked under particular depression. Both were pioneers in creating methods of bacteriological and histological staining technic which helped the progress of medicine.

Weigert's activities as a research worker and teacher continued for forty-three years (1871-1904). His work may be divided into three periods: Breslau period (from 1871 to 1878), Leipzig period (from 1878 to 1884), and Frankfurt period (from 1884 to 1904).

The early years of Weigert's research were devoted mainly to the study of smallpox. On August 30, 1871, his preliminary note, "On Bacteria in the Smallpox Lesion", was published. This is a significant date in the history of bacteriology for it records for the first time the staining of bacteria as a diagnostic method in the examination of pathological tissue. His complete researches on this subject appeared in 1874-75. He succeeded in demonstrating bacteria in some of the smallpox lesions. His study of smallpox was pioneer work of an epoch-making nature, new in its methods as well as in its concepts. Weigert's theory of primary tissue injury was in contradiction to all that was known then in pathology. It marked the beginning of the study of pathological tissue in serial section, and the beginning of differential, selective tissue staining.

Weigert showed in his work on smallpox that cocci and bacilli could be stained with the basic aniline dye, methyl violet. In 1879 he introduced the use of gentian violet and subsequently, acid fuchsin, aniline oil, and Bismarck brown. In 1881 he first advocated the method of double staining. With the aid of his method of staining he was the first to study the tissue changes as a result of bacterial invasion and was among the earliest to state that bacteria injure tissue through their toxins. He demonstrated bacteria in the blood-vessels (1874) and the mode of dissemination through the circulatory system both in animals and in man (1877).

Weigert's researches in the field of staining of bacteria were continued during his life work. Until the eighties of the last century preparations for microscopic examinations were stained only with carmine and hematoxylin so that everything in preparation was either red or blue, or if chemicals were used, the tissues were changed and useless for pathological studies. Weigert originated the selective staining

method which made clear microscopic pictures of the hidden structural elements. He started this pioneer work on selective staining as early as 1871. He then demonstrated bacteria in skin lesions of smallpox by staining them with ammonium-carmin solution followed by washing the preparation in a solution of hydrochloric acid and glycerine. Dr. Morrison states that Koch created the methods of bacterial culture, but Weigert must be ranked with him as a co-founder of this branch of science because it was he who created the methods of bacterial staining. For this Koch gratefully acknowledged his debt to Weigert.

Weigert divided the pathological phenomena of the smallpox lesions into two groups: (1) the necrotic, the primary, which gives a specific structure to the eruption, and (2) the irritative, the secondary, consisting of exudation, cell proliferation, suppuration, which have nothing specific about them. He first described a change in the epithelium, wherein the cells, injured by the smallpox virus, lose their nuclei, and being saturated by the lymph from the adjoining living tissue become a coagulated fibrin-like mass. This form of tissue injury, discovered by Weigert, was later named by Cohnheim coagulation necrosis.

Weigert's studies between 1871 and 1873 created his Siva ("Schiwa") theory, which was named after Siva, the Hindu god of destruction. He stated that the primary condition of pathological processes is the passive tissue injury and not the active cell proliferation (1874). Six years later, based on his further experiments in Leipzig, he stated that pathological tissue proliferation is entirely analogous to physiological generation of repair and denied the power of any external agencies to stimulate cells to proliferation. This is in opposition to Virchow's doctrine that inflammatory cell growth is the result of the action of external stimuli, the so-called inflammatory irritants, upon the cells. Weigert absolutely denied the power of any external factors directly to stimulate cells to proliferation. He considered that growth and performance of other functions by the cells are widely different: in the first, energy is stored up; in the second, energy is dissipated. He speaks of the first as the bioplastic or vegetative phase, and of the second as the catabistic or functional phase of cell activity.

He stated that the amount of regeneration of injured tissue is always in excess of what it needs for repair. Physiologically this overproduction appears only under certain conditions. In pathological

processes, however, it is a usual phenomenon. Garrison calls it Weigert's "quantitative" law.³

The second phase of Weigert's scientific work started in Leipzig. Adolf Strümpell, an assistant in the Leipzig Medical Clinic, tells that Cohnheim and Weigert introduced a new point of view. For the first time the etiology of disease was placed in the foreground. Tubercle bacilli were not yet discovered, but no one in Cohnheim's department doubted the infectious nature of tuberculosis. Weigert for the first time stated that the so-called primary exudative pleuritis was a tuberculous affection without exception, and he discovered tuberculosis of the veins. Dr. Morrison remarks that Weigert used the term tuberculous virus before Koch discovered the tubercle bacillus. Weigert considered the anemic infarct as the prototype of coagulation necrosis. In 1880 he first described fully infarction of the heart. In 1882 Weigert completed his first myelin sheath stain. This new field of activity is the beginning of the second period of his work, which originated methods of histological technic. There he also continued his contributions to general pathology, especially his studies of miliary tuberculosis and Bright's disease.

Hitherto it had been maintained that the essential active feature of chronic and interstitial inflammations, or fibrous processes, was the new growth of connective tissue which strangled the highly organized cells of the part. Weigert proved by his original histological methods that the primary and important lesion was the degeneration, atrophy or necrosis of the specialized cells, the parenchymal cells, their place being taken by the new growth of interstitial tissue. He asserted that there is no primary interstitial inflammation, and that the new growth of interstitial connective tissue is only a secondary reparative phenomenon, when the parenchyma is not replaced again. He considered an inflammation as a reparative process.

In 1879 Weigert presented a description and classification of nephritis as acute nephritis, subchronic and chronic forms. Cohnheim regarded this work as the clearest pathological description of the nephritic processes. Weigert's investigations of Bright's disease supported his conceptions of inflammation and of coagulation necrosis.

3) F. H. Garrison: *History of Medicine*, Phila., 1929, 574. Weigert's law was first published in the *Deut. Med. Wchnschr.*, 1896, XXII, 635.

Weigert held that injury of cells does not always mean their complete destruction, and he developed the principle of partial necrosis of cell protoplasm. In 1879 he demonstrated a partial coagulation necrosis in renal epithelium and in waxy degeneration of muscles. This conception was accepted later by embryologists as a factor in abnormal development.

Weigert was among the first to show anatomic findings for the curability of tuberculosis (1882). He was among the first to state that pulmonary tuberculosis is not a general infection or a septicemia, and he first described mixed or secondary infections in pulmonary tuberculosis. He was the first to find that the tuberculosis of childhood frequently differs anatomically from the tuberculosis of later life. He proved that tuberculosis of the serous surfaces is always a secondary disease. He was first to demonstrate that tuberculous pus contains detritus without nuclei in contrast with the ordinary phlegmonous pus.

The last period of Weigert's work (1884-1904) was devoted chiefly to histological technic which was of significance for many physiological and pathological conditions. He discovered staining methods that made possible the recognition of different elements of the nervous system. His search for a myelin sheath lasted from 1882 to 1885. As the fat-like myelin sheath does not take any stain, Weigert overcame this obstacle by using mordant method. Weigert's myelin sheath method created the comparative anatomy of the brain (Edinger). It also made possible the greatest part of recent progress in the field of the anatomy of the spinal cord (Schmaus). His staining of fibrin (1886) aided the investigations in the field of inflammation and thrombosis. His elastic fiber stain helped the study of the pathology of this tissue. His Bismarck brown, gentian violet and analine oil laid the basis for modern investigations of micro-organisms.⁴ Weigert's technic of staining made it possible to study directly morbid changes of the brain. His achievements gave a strong impulse to investigations of the pathology of the brain. His neuroglia stain method advanced the knowledge of the neuroglia in the normal central nervous system.

4) I. Fisher: *Biog. Lexikon*, Berlin and Vienna, 1933, II, 1655.

Weigert's place in medical history ranks high as a pioneer in staining methods and in the theory of inflammation. As a far-seeing investigator, he covered a wide field of medical problems and added new concepts in each phase of his research. All his original statements were confirmed by his contemporaries and greatly influenced the advancement of medical science. As an original thinker, he tried to coordinate diseases of the different organs under one general pathological law. He stressed particularly his conception of tissue injury as the primary disease phenomenon which results in a disturbance of equilibrium of the tissue elements and subsequent cell proliferation (Strümpell). Osler said that "to Weigert pathological history owes an enormous debt." His last work intended to formulate the results of his researches into a great universal law applicable both to animal and plant pathology, but his sudden death left this work incomplete. The climax of his achievements was his discovery of various staining methods in which field his talent stood out triumphantly, and which work served as a foundation for future builders of medicine.

Weigert was a man of medium stature, of a charming personality, "his beautiful eyes expressing gentleness and intelligence." He was a gifted story-teller, an interesting conversationalist, and a proficient linguist. He was a very diligent student but was not anxious to excel in his studies. He was extremely modest, underestimated his own worth, and avoided publicity. His life was of an ascetic nature; he could enjoy a rich life by replacing research work with medical practice, but he loved science above all.

Weigert rarely entered a controversy but stood vigorously for the defense of his friends; so in 1883 he defended Koch's work on tuberculosis. He was very critical about his own work. Thus he many times rewrote his work on smallpox until it satisfied him. He discovered his elastic fiber staining method in 1887, but did not publish it until eleven years later, when he was convinced that his method gave better results than did the others. He worked three years to perfect his myelin sheath stain, and seventeen years on his neuroglia staining method.

Weigert was a keen, profound thinker and philosopher, and an original researcher. He had a clear vision and a broad imagination. His ultimate aim was to find general laws for morphological processes

in pathology confirmed in the biology of the animal and plant kingdoms.

Weigert was an exceptionally devoted son and friend. When his parents met with financial losses he supported them with his limited resources. Lichtheim, an old friend of his, relates that whenever he visited him in Leipzig he often found that he actually had nothing but bread for supper and yet gave no word of complaint. Weigert's friendship with Ehrlich, Cohnheim and Koch was of a lifelong duration, and his pupils and associates had a strong affection for him.

He died on August 5, 1904, at Frankfurt-on-Main, at the age of fifty-five. His name went down in history as one of the greatest medical pathfinders of his time.

The sources of biographical data are: R. Rieder's essay, "Carl Weigert," *Gesammelte Abhandlungen*, Berlin, 1906, I, 1-132; L. Edinger, *ibid.*, 133-137; P. Ehrlich, *ibid.*, 138-141; H. Morrison, "Carl Weigert," *Ann. Med. Hist.*, New York, Paul B. Hoeber, publisher, 1924, VI, 163-177; J. Pagel, *Biog. Lexikon*, Berlin and Vienna, 1901, 1825-1826; *Schriftenverzeichnis in Zbl. Path.*, 1904, XV, 183; S. R. Long, *The History of Pathology*, Baltimore, 1928; M. G. Seelig, *Medicine in Historical Outline*, Baltimore, 1925; H. D. Rolleston, *The Harveian Oration*, Cambridge Univ. Press, 1928, 21.

CHAPTER X

SIR WILLIAM OSLER

(1849-1919)

We cannot look, however imperfectly, upon a great man without gaining something from him. He is the living light — the fountain, which it is good and pleasant to be near.

— THOMAS CARLYLE

The medical profession is the most distinguished of all professions.

— HIPPOCRATES

Sir William Osler was considered the foremost clinician of his time, the teacher of teachers, and an authority on pathology and medical ethics. His teachings and interests were not limited to medical research and history but dealt with every phase of medical life and literature. He was the guide and mentor not only of his pupils and co-workers but also of the medical profession as a whole. He was an incarnation of the ideal physician.

William Osler was born at Bond Head, Canada, on July 12, 1849, was graduated from McGill University in 1872, was professor at his alma mater (1874-84), professor of clinical medicine at the University of Pennsylvania (1885-88), and at Johns Hopkins University (1889-1904), and Regius Professor of medicine at the University of Oxford, England (1905-19). His success as a physician, teacher and author was achieved mainly in the United States during the years of 1884 to 1904. It was at the Johns Hopkins that he made the greatest impression on medical teaching, advancing the bedside "do-it-yourself" method of instruction. The Baltimore period, in fact, was the golden era of Osler's achievements. There he wrote the most important work of some 750 articles, books and addresses.

MEDICAL CONTRIBUTIONS

Osler contributed scientific work to clinical medicine, pathology and hematology. During his Montreal Period (1870-84) he first observed the presence of blood platelets (1873);¹ studied the action of atropin and physostygmmin upon the leukocytes (1873);² reported the aggregation of blood platelets, which takes place as soon as the blood is withdrawn from the body, known as Osler's phenomenon (1882).³ In his Philadelphia (1884-89) and Baltimore (1889-1904) periods he presented a group of symptoms in gall-stones (1897), later named after him "Osler's syndrome";⁴ described a new clinical entity of visceral manifestations and joint symptoms in erythema group, called Osler's triad;⁵ investigated hereditary epistaxis with hemorrhagic telangiectasia (1901), which is known as Rendu-Osler-Weber disease;⁶ described erythremia marked with cyanosis, polycythemia and enlarged spleen (1903-08), known as Osler's disease or as Vaquez-Osler's disease.⁷ In his Oxford period he discovered "Osler's spots" in malignant endocarditis (1909).⁸

Other Osler contributions include his pioneer work in myxoedema: he wrote on cachexia strumapriiva (1884) which was the first forward step since Ord's demonstration, on thyroid gland and myxoedema (1885), surgical myxoedema (1886), reported a case of myxoedema treated successfully with thyroid extract (1895) and six cases of Addison's disease benefited by the administration of suprarenal extract (1906). He described a parasitic nematode (1887) which Cob-

1) W. Osler and E. A. Schäfer: Ueber einige im Blute vorhandene bakterien — bildende Massen, *Centralbl. f. d. med. Wissensch.*, Berlin, 1873, XI, 577-578; *Proc. Royal Soc.*, London, 1873-74, XXII, 391-398.

2) *Quart. J. Micr. Sc.*, London, 1873, XIII, 307-309.

3) *Med. News*, Phila., 1882, XL, 250; M. E. Abbott: *Classified and Annotated Bibliography of Sir William Osler's Publications*, Montreal, 1939, 5; *Canada M. and S. J.*, 1882, X, 499-500.

4) "A Clinical Lecture on the Ball-Valve Gallstone in the Common Duct," *Lancet*, London, 1897, I, 1319-1323.

5) *Am. J. M. Sc.*, Phila., 1895, CX, 629-646; *Brit. J. Dermat.*, London, 1900, XII, 227-245.

6) *Bull. Johns Hopkins Hosp.*, Baltimore, 1901, XII, 333-337.

7) *Am. J. M. Sc.*, Phila., 1903, CXXVI, 187-201; "A Clinical Lecture on Erythraemia," *Lancet*, London, 1908, I, 143-146.

8) Osler's spots in malignant endocarditis are also known as "Osler's nodes" or Osler symptom. See E. Libman: "Osler and Endocarditis and Mycotic Aneurism," *Sir William Osler Memorial Number*, Montreal, 1926, 12. See also *Quart. J. Med.*, Oxford (Jan.) 1909, 222.

bold subsequently renamed *Filaria Osleriei* (1879), and later a new genus, *Oslerus*, has been proposed for Osler's nematode;⁹ described first the form and activity of the amebae of Amebic dysentery, confirming the observations of Kartulis; discovered a trematode on the skin of *Necturus* which was later called by Prof. Ramsey Wright as *Sphyranura Osleriei*.¹⁰ He described the morbid anatomy of typhoid fever (1885), symptoms and treatment (1886, 1895), spontaneous and experimental typhoid (1888), and clarified the problem of typhoid fever in the United States (1899). He stressed the importance of preventing tuberculosis through sanitary science and stimulated the establishment of municipal sanatoria in tuberculosis (1900-03). He also made extensive researches in malaria, pneumonia, cancer, cardiovascular diseases, and many other medical subjects.

On December 4, 1914, Osler, in a letter to Professor Souchon, summarized his original contributions as follows:

The only contributions of mine that are worth mentioning are: (1) The determination of the blood platelets as separate elements in the circulation. (Proceedings of the Royal Society, 1874). (2) The work done by myself and my students, particularly Thayer, MacCallum and Lazear, in connection with malarial parasites. (3) The work helping to place amoebic dysentery on a pathological and clinical foundation. (4) The full clinical description of the polycythemia rubra, or erythremia. (5) The description of hereditary telangiectasis with epistaxis. (6) The clinical description of the visceral types of purpura and angio-neurotic-oedema.¹¹

Osler was regarded by his contemporaries as a therapeutic nihilist. In connection with this, it is of interest to note Dr. D. I. Macht's study of Osler's prescriptions during 1898-1906. Dr. Macht found that among 130 of Osler's prescriptions the great majority were *simple* prescriptions, *i. e.*, called for but one single ingredient, and only ten were *compound* prescriptions. He concludes that Osler was a pioneer in rational pharmacotherapy in contradistinction to the misguided polypharmacists of his time. Because at that time pharmacology was in

9) H. Cushing, *Life of Sir William Osler*, 1925, I, 152, 211, 365, 433, 569.

10) W. G. MacCallum, "Osler at Old Blockley," *Med. Rec.*, 1940, CLII, 116.

11) M. L. Marshal: "Two Letters of Sir William Osler," *Bull. Inst. Hist. Med.*, Baltimore (Jan.) 1937, V, 96.

its infancy and little was known concerning the pharmacological effect of drug combinations, Osler used to prescribe only chemical agents the physiological action of which had been proven, and avoided irrational vagaries and mystic combinations of chemicals. Osler's attitude on this subject, according to Dr. Macht, "was a vital link between the scholasticism of the past and the scientific medicine of the present."

TEACHER AND ORGANIZER

Virchow and Traube held that animal experimentation was the principal method of scientific research. In 1880 Frerichs and Leyden introduced the independence of clinical medicine. According to them, the main method is the study of diseases by means of collecting information at the bedside. In 1860 A. Jacobi first introduced bedside teaching of pediatrics in the United States. Osler put on a firm basis the bedside teaching and practical work. Dr. Joseph McFarland tells: "All of his [Osler's] teaching was at the bedside, the bed being wheeled into the lecture room before the whole class of students in the University Hospital, or a group of students going into the ward with him in the Blockley Hospital."¹² Dr. William G. MacCallum, Osler's associate, adds that Osler's bedside teaching each morning stirred the students to enthusiasm, and his afternoon demonstrations at Blockley of postmortem examinations impressed his associates and pupils.

Osler advocated the combination of clinical medicine with laboratory work. He was insistent upon not treating the patient until you knew what ailed him. He searched in fever patients for malarial parasites and continued the examination of the blood daily, often delaying the administration of the specific treatment until he had studied all phases of the parasitic development. This principle was once carried so far that it almost brought about his expulsion from Blockley, but he continued in very much the same way.

Professor McFarland in a personal communication writes that at the time when Osler was professor at the University of Pennsylvania

12) Joseph McFarland, M.D., Sc.D., was professor of pathology and bacteriology at the Medico-Chirurgical College of Philadelphia (1896-1916) and professor of pathology at the University of Pennsylvania (1916-1937). He has written six books and 200 papers on subjects pertaining to medical and surgical pathology, general and medical biology, pathogenic bacteria and Protozoa, diseases and treatment of the breast, and medical history. See J. McFarland: "Osler as I Knew Him," *Med Rec.*, N. Y., 1940, CLII, 113.

the microscope was scarcely used in clinical medicine except for the examination of urinary sediments. Osler brought the microscope into the hospital wards and examined the blood of all fever patients for malarial parasites. He also performed laboratory researches with dysenteric ameba, filarial worms, and with diseases of the blood. He had the first blood corpuscle counting apparatus in Philadelphia, and his observations and deductions were most scientific and instructive. He was always far in advance of his colleagues, and was frequently sneered at. In connection with Osler's views on medical training and education, it is of interest to quote his following dicta: "To study the phenomena of disease without books is to sail an uncharted sea; while to study books without patients is not to go to sea at all." He also said: "Every medical student should remember that his end is not to be a chemist, or a physiologist or an anatomist, but to learn how to recognize and treat disease, to become a practical physician." Osler taught that cure meant prevention, and that treatment should be based on a scientific ground confirmed by experiments or experience, and not based on unproved theories. He remarked: "From Hippocrates to Hunter, the treatment of disease was one long traffic in hypotheses." Osler's high standards for the medical profession are evidenced in his following aphorisms: "There are only two sorts of doctors: those who practise with their brains, and those who practise with their tongues." "In no profession does culture count for so much as in medicine, and no man needs it more than the general practitioner."

Professor McFarland related to me the following reminiscences of Osler:

A writer of eloquent and forceful English and fascinating when he read his prepared essays, Osler seemed to have difficulty with extemporaneous speech, not in ordinary conversation, when, after dinner in his own home, surrounded by a few chosen friends, he let himself go and rambled about in the realms of travel, literature, poetry, and art, but in the clinic and at the bedside. The difficulty may have been largely preoccupation with a variety of things, but his speech was sometimes so filled with interruptions and lightning-like changes of subject as to be almost incoherent. I remember a particularly bad occasion of this kind, when my classmate, Charles N. Davis, amused himself by taking down everything exactly as said. Unfortunately the man is dead and I can't find the notes, that I read with amusement at the time. Osler

enters the door of the clinical amphitheatre of the University Hospital, where the class is assembled and the patient, in bed, about to be wheeled in. Osler speaks:—

“This morning —

“Turn the bed a little more to the left so that we can see his chest better.

“This morning —

“What was the most interesting case you saw last time? (The patient to whom he referred had had but one eye, and the most facetious member of the class instantaneously responded, a “Cyclops.”)

“Yes, and what did the Cyclops have?

(Then followed a brief resume of that case.)

“This morning — Doctor, I left my stethoscope outside, please bring it in.

“This morning I want to show you another patient that you have all seen before.

“Did you see this man before?

“This morning I bring him back again because something has happened that is very unusual.

“What was his most important symptom when you saw him before? That’s it, Cheyne-Stokes respiration. Does he have it now? No.

“This morning, gentlemen, I bring him in in order that you may all see that he is actually on the way to recovery. I do that because I want every one of you to be able to say at any time in the future, ‘Yes, I have seen a patient with Cheyne-Stokes respiration get well.’”

Now that is an example of preoccupation in the beginning and concentration at the end. And the lesson, you see, is as vivid in my recollection today as it was more than a half century ago when it was given.

Osler stimulated his pupils and associates to keep on working. Professor McFarland recalls the following incident. “One day in 1896 I unexpectedly met Osler in a Woodland Avenue street car in Philadelphia; and although he had not seen me for five or six years, and had scarcely known me better than other students, he recognized me at once, rose and changed his seat to sit beside me, called me by name, and said impressively, ‘I know all about you, you are doing good work, good work.’ Think of the encouragement that was to a young man.”

Dr. Osler was much interested in the publication of the Johns Hopkins Hospital staff and encouraged these writers in their work,

saying, "Keep up the good work, and you will get to the top." He had a group of his students and house officers come to his home almost every Saturday evening. At these friendly meetings, informal discussions of interesting cases at the hospital took place. Osler would get out some historical books from his library, and talk in a stimulating manner about them, inspiring his pupils toward research in medical history.¹³

Osler never failed to encourage his young pupils. He wrote them kind notes showing his understanding of their endeavors and talent. The following letter of Osler was addressed to Dr. Herbert Allen when he finished his internship at Johns Hopkins Hospital.

Inchenen, North Berwick, VIII 21, '01

Dear Allen: Before you leave I wish to thank you for the good work you have done in the wards during the past year — It has been a great pleasure to hear that you are going to the Lakeside Hospital, — which will give you a good opening for additional work. With kindest regards and best wishes I am

Sincerely yours,

WILLIAM OSLER

To Dr. Herbert W. Allen, San Francisco, Calif.

Osler selected as his resident physicians H. A. Lafleur, W. S. Thayer, T. B. Fletcher, T. McCrae and R. I. Cole, and sought as assistants and internes gifted young graduates. He liked to keep his resident physicians for several years, and developed in them the spirit of earnestness, love of thoroughness, and a desire to make original contributions to science. "Through his pupils he may be said to have created an American school of internal medicine."¹⁴

Osler contributed much to medical history and book-lore. Never did he fail to stress the historical aspect of whatever he spoke or wrote, and the medical history club which he founded at the Johns Hopkins was the prototype of many similar study groups throughout this country, Canada and England. He wrote extensively in this field throughout his long career and stimulated a like interest in all his disciples.

Osler's biographical and historical addresses belong to "the litera-

13) H. Young: *A Surgeon's Autobiography*, Harcourt, Brace & Co., N. Y., 1940, 67.

14) L. F. Barker: "Osler, Sir William," *Dict. Am. Biog.*, N. Y., 1934, XIV, 85.

ture of power", the kind of literature that profoundly influences people in the conduct of their lives (Garrison). His biographical sketches are classics. He considered biography as an important complement to the study of man's work. "Biography is a department which you will find a very attractive and most profitable field to cultivate for your readers."

William White writes: "All his [Osler's] efforts as a biographer concentrated either on making a forgotten man live again, as in 'An Alabama Student,' or on exhuming a forgotten side of a man already great, as in the Locke essay." White concludes that "In his biographical studies Osler has done a service to all mankind in turning the light of his vast knowledge on those subjects which most needed this particular type of illumination. He has furnished a necessary link in the transmission of culture, and in its transmutation, too." Osler published more than one hundred essays of a biographical or historical nature. They show Osler's thorough appreciation of the spirit of the time he treated of, and his mastery of philological criticism and his careful balanced treatment of the historical data which he composed into a picture of vivid description and interpretation.¹⁵

Osler revived and stimulated interest in Sir Thomas Browne and his *Religio Medici*, and in Burton's *Anatomy of Melancholy*. Dr. F. H. Garrison in a letter to Dr. M. G. Seelig wrote that lecturing medical history is not the way to get at students, "but the more immediate methods of Osler in the clinic and around the library table. . . . The merit of Osler was that he revived the old-fashioned relation of medical preceptor to indentured pupil and really played private tutor to his class in his own home."

William White, who analyzed Osler's essays "The Student Life", "Man's Redemption of Man", "The Evolution of Modern Medicine", "A Way of Life", and "Science and Immortality" which were included in *Aequanimitas*, remarks: "It will be found that a unifying note runs through all of Osler's inspirational essays: a strong equanimity, based upon a strict stoic philosophy, is the counsel which he preaches."¹⁶

Osler was a great teacher of medical ethics, and he developed in the younger generation of the profession high ideals of the art of heal-

15) W. White: "The Biographical Essays of Sir William Osler and Their Relation to Medical History," *Bull. Hist. Med.*, 1939, VII, 28, 32, 38, 48.

16) W. White: "Aequanimitas: Osler's Inspirational Essays," *Bull. Inst. Hist. Med.* (July) 1938, VI, 831.

ing, and its relation to science and humanity. Osler's addresses transmit his ideas concerning the mission and obligations of the medical profession to humanity. They aroused tremendous enthusiasm among the profession and stimulated the perception of a finer side of life, of more ethical principles, than is commonly afforded in our ordinary workday experience. "This was the great secret of his hold upon young people" (Garrison). It is of interest to learn that Eli Lilly Company for the past several years has presented annually to medical graduates Osler's book *Aequanimitas and other Addresses* (3rd edition, 1932). This inspiring gift contains an attached letter of the president of the company which reads as follows:

Dear Doctor, Together with congratulations on your attainment of a medical degree, this volume of addresses by Sir William Osler, who adorned your profession in the United States for so many years, is cordially presented.

As the addresses by this master mind of modern medicine are read, may you catch his vision of the almost boundless possibilities of your chosen profession.

I had occasion to visit a talented young surgeon, and found him reading Osler's *Aequanimitas*. He told me that this book planted in him high medical ethical principles. He felt that the every-day reading of fragments of this work served for him as a source of inspiration. The fact is that not only those of the younger generation demonstrate their unlimited admiration for Osler's writings, but also the leaders of the profession. Thus, the late Dr. Harvey Cushing wrote to Mr. William White in 1938: "I have read them with the greatest interest, and find pleasure in reading Osler's notes and essays over and over again. I seem to find something new in them every time I reread them."¹⁷

It is of interest to quote an excerpt from Dr. F. H. Garrison's letter to Dr. E. C. Streeter concerning Osler's Silliman Lectures. Among other things, Garrison wrote: "This book is also a capital exemplar of Osler's method of gentle persuasive stimulus, his personality and his unexampled power of stimulating colleagues and pupils to do good work. . . . Every physician should not only acquire these

17) W. White: "With Letters from Cushing," *Medical Record*, 1940, CLI, adv., p. 10.

lectures, but read them, that he may plus up his interest in the great wonderful world outside of bedside practice and laboratory interests, and so quicken his perceptions, stabilize his professional ideals and ethical standards."¹⁸

Osler was a master in characterizing men most profoundly. Few have approached him in charm of literary composition and in using the proper wording. His witty sentences grasped the essential feature of the person. Osler's dicta are frequently quoted by many historians, biographers and writers. He had a gift of presenting *multum in parvo* in his description of historical men and events with the thoroughness of a scientist and skill of an artist. The following description by Osler of Maimonides may serve as an illustration: ". . . Cordova boasts of three of the greatest names in the history of Arabian medicine: Avenzoar, Albucasis, and Averroes (Avenzoar is indeed claimed to be a Jew). Great as is the fame of Averroes as the commentator and transmitter of Aristotle to scholastic Europe, his fame is enhanced as the teacher and inspirer of Moses ben Maimon. Exiled from Spain, this great teacher became in Egypt the Thomas Aquinas of Jewry, the conciliator of the Bible and the Talmud with the philosophy of Aristotle. He remains one of Israel's great prophets, and while devoted to theology and philosophy, he was a distinguished and successful practitioner of medicine and the author of many works highly prized for nearly five centuries, some of which are still reprinted."¹⁹

The following passages from his essay "Israel and Medicine" is a good illustration of Osler's remarkable ability to judge human values:

In estimating the position of Israel in the human values we must remember that the quest for righteousness is Oriental, the quest for knowledge Occidental. . . . Not that Israel is all heart, nor Greece all head, for in estimating the human

18) See *Life and Letters of Fielding H. Garrison* by S. R. Kagan, 1938, 137.

19) Wm. Osler: "Israel and Medicine," *Menorah Jour.*, New York, 1915, I, 146-147. With reference to Osler's essay, it is of interest to quote Dr. Macht's parallelism between Maimonides and Osler. He found in Maimonides and Osler common features: both stressed the importance of etiology and pathology in studying diseases; both advocated simple rational medication and placed their reliance on *Vis Medicatrix Naturae*; both considered prophylaxis and hygiene more important than therapeutic agents; both preached sane morality and saw the value of harmonizing science with humanities. See D. I. Macht: "Moses Maimonides, Physician and Scientist," *Bull. Inst. Hist. Med.*, 1935, III, 596-597.

value of the two races, intellect and science are found in Jerusalem and beauty and truth at Athens, but in different proportions. . . . Modern civilization is the outcome of these two great movements of the mind of man, who to-day is ruled in heart and head by Israel and by Greece. . . . In the early Middle Ages the Jewish physicians played a role of the first importance as preservers and transmitters of ancient knowledge. . . . In the Eastern and Western Caliphates and in North Africa were men who today are the glory of Israel, and bright stars in the medical firmament. . . . In the medical profession the Jews have a long and honorable record.²⁰

Of significance is Osler's letter from Berlin, dated 1884:

Should another Moses arise and preach a Semitic exodus from Germany, and should he prevail, they would leave the land impoverished far more than was ancient Egypt by the loss of the 'jewels of gold and jewels of silver' of which the people were 'spoiled.' To say nothing of the material wealth, enough to buy Palestine over and over again, there is not a profession which would not suffer the serious loss of many of its most brilliant ornaments, and in none more so than our own.²¹

In 1905 Osler delivered at the Johns Hopkins University his valedictory address, "The Fixed Period," in which he related "the comparative uselessness of men above forty years of age," quoting the humorous phrase from Anthony Trollope's novel of the same name "a peaceful departure by chloroform" as the best treatment of aged men. According to him, the most efficient work is done by men between the ages of twenty-five and forty. A certain section of the lay press erroneously interpreted Osler's address as advocating the painless extinction by chloroform of men over sixty years of age, so that the verb "to Oslerize" got into a popular dictionary. Allbutt in 1905 said that "Regius Professors may supplement each other researches" and placed the age of greatest mental accomplishment between forty-five and fifty. Some encyclopedias remarked that Osler was known to the public mainly as the author of a statement that "a man should be chloroformed at sixty", but they emphasized that this statement was

20) Wm. Osler: "Men and Books," *Canada Med. Ass. J.*, 1914, IV, 733.

21) Wm. Osler: "Letters from Berlin," *Canada Med. and Surg. J.*, Montreal (July) 1884, XII, 728.

misquoted and distorted. In connection with this matter it is of interest to quote William White's conclusion that the newspapers purposely quoted a certain part of Osler's address, "using just enough of it to entirely twist its meaning and lose all the gentle humor it contained. It was a good opportunity. There had been a mutual antipathy between Osler and the press for some time, arising out of Osler's natural distrust, as a man of science, for journalistic exaggeration."²² A similar instance happened to Allbutt, who, in 1903, gave an address on the activities of medical men in tuberculosis. A British newspaper reported on that day that Allbutt advocated "that the medical profession should cease to mitigate incurable disease," which was the opposite of what he said. This misrepresentation did not create a furore. Thus Allbutt was more fortunate than Osler, whose farewell address in 1905 was widely misinterpreted in the press, presenting him as an enemy of old men. Osler regretted this misunderstanding, and never quite forgave the newspapers and the physicians for accepting his remark as other than a joke. He never changed his opinion concerning the period of accomplishing the best work. His colleague, Sir Clifford, agreed with him in the principle of a fixed period in man's life for achievements, but disagreed in the dates. Allbutt, who reviewed the lives of eminent men of science, poets, painters, and musicians, concluded that the greatest mental accomplishments occur somewhere between forty-five and fifty, and that no teacher reaches his best until middle life; then it is that erudition and experience mature into wisdom.

Osler was great in various aspects of human thought and activities, was an original thinker in science, literature, and philosophy. Although Sir Clifford Allbutt had occasion to know him intimately for a great number of years, nevertheless he wrote in 1919: "I did not know the half of him. I wonder if he himself realized all of that many-chambered mind of his, all of those many accomplishments!" In the same year in his address on the Seventieth birthday anniversary of Osler he said: "In you we see the fruitfulness of the marriage of science and letters." Later in 1920, in his obituary of Osler, Allbutt wrote: "A quality which made Osler so fascinating a companion, his teaching so

22) W. White: "Re-Echoes of Sir William Osler's 'The Fixed Period,'" *Bull. Inst. Hist. Med.* (Dec.) 1937, V, 939; H. Rolleston: *Sir Thomas Clifford Allbutt*, London, 1929, 76, 172; S. A. Knopf: "Osler and the Anti-Tuberculosis Movement," *Sir William Osler Memorial Number*, 1926, 328.

vivid and telling, and his parts in debate often so lively, was his wit and humor, the sharpness of the wit tempered by the sweetness of the humor." In 1924 he wrote to Lady Osler about Sir William: "He was an invaluable Examiner — sympathetic, broadminded, acceptable to the men — and his 'over-indulgence' (if any) was in *words* and fun. He knew his duty and did it, even if unwillingly in a few cases, as with all of us."²³

Dr. Abraham Jacobi said of Osler: "To him medicine is no private or narrow business. He is the statesman in medicine, which is to him not a trade, but a vocation and a religion." Dr. F. H. Garrison stated: "His position in the history of medicine is based upon genuine scientific achievement, learning of the most rare and varied kind." Dr. H. Zinsser wrote that Osler's career "bridged the heroic age of medicine."

Doctor Osler was so deeply interested in classical education that his own old-fashioned scholarship was one of his finest traits. When he was elected president of the Classical Society of Great Britain, he made one of the best presidential speeches before that body that had ever been delivered. Many authors applied to him for information concerning classics and arts.

The last period of Osler's activities was at Oxford from 1904 to 1919. Dr. Maude E. Abbott characterizes the Oxford period as follows: "It was indeed a remarkable fate that brought him in the closing years of his well rounded life to this centre of the Humanities, where through his acute historic sense and enthusiasm as a collector he could best complete his life studies on the origins of scientific medicine in intimate contact with the older European centres of thought."²⁴

One of Osler's main interests during this period was the Bodleian Library, of which he was a curator. He was generous to many libraries and medical museums, particularly to his alma mater. Osler was Master of the Almshouse, a member of two committees at the Board of Education and Treasury. He was active in various problems of public health, in medical education, and medical organizations in England.

Osler had many-sided interests beside scientific medicine. He showed

23) *The Right Honourable Sir Thomas Clifford Allbutt*, London, 1929, 76, 172, 241, 245, 288.

24) M. E. Abbott: "More About Osler," *Bull. Inst. Hist. Med.*, 1937, Baltimore, V, 796.

great interest to many libraries and museums. He conceived the *Bibliotheca Osleriana* for the purpose of giving a picture of the development of medicine in all ages, and to present the physician and the profession as they were portrayed in literature.²⁵

Osler was an example of perfection: a brilliant mind, charming person and eloquent speaker. Sir Humphry Rolleston has said of Osler that like Trousseau he ranged widely over the whole field of medicine and enriched it both by observation and by deductions based on collected statistics. He was the ideal and inspiring guide of his pupils, and taught them not only medicine, but also humanity and the way of life more by example than by solemn precept. "We shall not look upon his like again."²⁶

Osler's influence was tremendous not only during his life but also to this very day. Numerous local student organizations and societies such as the Osler Clubs have been established for the purpose of studying medical history and keeping up Osler's ethical standards. Thus there are Osler Clubs at Oxford, where he had more than 200 meetings, at London, at McGill University, at the University of Vermont, and in many other places. In commemoration of Osler, there was founded the Osler Gold Medal of Oxford University, awarded triennially for the best contribution to clinical medicine in that period. On June 10, 1925, on the Court of the Oxford University the unveiling of a bronze memorial plaque to Sir William Osler took place. On October 5, 1904, the opening of Osler's new clinical amphitheatre at the Johns Hopkins Hospital took place. In 1909 Professor H. Young was chairman of the committee for furnishing the new building of the Medical and Chirurgical Faculty on Cathedral Street, Baltimore. The auditorium of this building, on Dr. Young's suggestion, was named for Sir William Osler.

An important monument to Osler's memory is Dr. Maude E. Abbott's *Sir William Osler Memorial Number, Appreciations and Reminiscences*, 1926. In this volume she presented a classified and annotated bibliography of Osler's publications which was reprinted with additions in 1939 and numbers 1,551 items, of which 482 are original work, including thirteen books and twenty-eight papers in various *Systems*. "The result is," writes Dr. W. W. Francis, "a handy

25) W. White: "Sir William Osler as a Critic of the Novel," *Medical Record*, CXLVIII, 1938, 340-342.

26) H. Rolleston, *Brit. Med. Jour.*, London, 1925, I, 1932.

and definite record of the writings of one of the best and most prolific medical authors, of what Osler himself called his ink-pot career."

In the United States there was recently established the Osler Memorial Building in Philadelphia. The old autopsy house at the Philadelphia General Hospital, where Osler worked from 1885 to 1889, has been restored to be used as a museum of Osleriana and was dedicated on June 8, 1940. Dr. H. O. Kelly, the only living member of the famous group who worked with Osler at Johns Hopkins, was present. Eleven resident physicians who served under Osler at the Hospital (then known as Blockley) were also present. Among the speakers was Dr. W. E. Robertson, who paid tribute to the late Dr. David Riesman (1867-1940), one of the workers most active in establishing the Osler memorial for the first time in the United States. An important feature of the ceremony was the unveiling of the painting "Osler at Old Blockley" by Dean Cornwell. The painting depicts Osler surrounded by his students at the bedside of a patient on the hospital grounds. The autopsy building in which Osler did important research work and teaching is shown in the background. Before the painting was completed Mr. Cornwell consulted many authorities for advice. These included Dr. David Riesman, a former associate of Osler; Dr. Harvey Cushing, Osler's greatest pupil and biographer; and Dr. William E. Hughes, a former student of Osler at Old Blockley.

PERSONAL TRAITS

Osler was a preacher of morals and ethics, of modesty and friendship, of progress and humanity. He followed these rules in his practice, daily life, addresses and lectures. He was kind, cheerful, sincere, and energetic. His strongest trait was his modesty which was striking. Professor Gulland said of Osler: "It was his personality and his personal radiation which gave him the immense power for good which he possessed. He seemed to exercise this only half-consciously; he was too humble-minded to value himself as we valued him." Allbutt wrote about Osler in the same way: "The most modest of men, his conversation was always of the good work of others, silent on his own." In 1914 Dr. E. Souchon wrote to Osler that he was going to publish a work on original American contributions to medical sciences, noting that under original he meant something that had not been done before by somebody else, and asked Osler to send him the titles of his *original* contributions. Under the date of January 19, 1915, Osler replied:

"I do not think I have ever done anything that has not been done by someone previously, often very much better. One picks up a brick or two and carries it to the common edifice, but I have only been a hod carrier and do not come into class with the great architects of the whole building, or even with the designers and decorators of the halls and rooms."²⁷

The following instance is another characteristic example of Osler's modesty. In 1909 at the annual meeting of the British Medical Association, Allbutt described a mild degree of angina pectoris; Osler was there and spoke also in agreement, but did not mention that this mild form of angina pectoris was already fully described by him in his text-book. Osler did not like publicity and avoided reporters. In 1914 the Association of Physicians of Great Britain and Ireland was founded largely as a result of Osler's efforts, and one of its rules was: "No reporters shall be present, and no report of the proceedings shall be sent to the journals or newspapers." He was also a founder of the Association of American Physicians in 1886, the rules of which are on much the same lines and spirit.

When Osler accepted his appointment as Regius Professor of Medicine at Oxford, Mitchell still called him "An American physician." Osler maintained close relationship with his American friends; this is evidenced by his numerous letters to his American colleagues. One fact deserves to be mentioned, namely, that when Mitchell was elected as foreign Fellow of the Royal Society in England, Osler cabled him before he was officially notified of his appointment. In addition on May 23, 1908, Osler wrote to him: "I was greatly pleased as at the last meeting a few weeks ago the general impression was that Ehrlich would have the nomination." Mitchell's election was due to the efforts of Osler, Ferriar, and Bradford.²⁸

Another feature of Osler was his keen sense of humor. Both his personal conversation and public addresses were frequently punctuated with amusing anecdotes. In the United States and England there are circulating some anecdotes of Osler. One of Osler's friends kindly told me one of them, and I submit it herewith, as it is characteristic of the man.

Osler had, according to legend, at least, a detestation for reporters

27) M. L. Marshall: "Two Letters of Sir William Osler," *Bull. Inst. Hist. Med.*, Baltimore, 1937, V, 97.

28) A. R. Burr: *Weir Mitchell, His Life and Letters*, New York, 1929, 314.

who nosed into medical matters without having the training to understand them. He liked to set them off on the wrong track. The result was that sometimes the reporters got the most curious stories when they called on Osler for the substantiation of various medical matters. Once, as the story was told at least, Dr. Abraham Jacobi of New York was, on invitation, to read a paper before the Johns Hopkins Historical Society. The reporters came around, instructed to procure all the information they could about this New Yorker. Osler was expected to supply the information. He told the reporters that Dr. Jacobi was really our most distinguished specialist in children's diseases in this country, and that he was famous for his use of exercise for therapeutic purposes. He said that the dear old man from New York used still, at the age of nearly eighty, to run five miles before breakfast every morning. Anyone who knew Jacobi and his ways would appreciate that this was exactly the opposite of what Jacobi was likely to do.

As is well known, Osler served as an Oxford and Cambridge Medical Examiner, but he resigned from the Cambridge position probably because the dates of examinations in the two universities might clash, and besides he was very busy with his manifold work. Sir William in a joke said that he was dropped by the Cambridge Examining Board. This caused a medical writer to state that Sir William was dropped by the Board as an examiner, but Allbutt insisted on crossing out this erroneous remark.

Osler's charm, success, and serene hold upon the medical profession were the results, not only of his mental power and the widest knowledge, but also of his vitality and sympathetic personal traits. Dr. F. H. Garrison characterized Osler: "What made him, in a very real sense, the ideal physician, the essential humanist of modern medicine, was wonderful genius for friendship toward all and sundry; and, consequent upon this trait, his large, cosmopolitan spirit, his power of composing disputes and differences, of making peace upon the high places. . . . A personality of this kind, combining the spiritual gravity of Pasteur or Lister with the engaging humanity of Astley Cooper or Ludwig, Syme or Dieulafoy, is rare in medicine. To possess it is, in itself, a kind of genius."²⁹

29) F. H. Garrison: *Foreword to A Physician's Anthology of English and American Poetry*, London, Oxford Univ. Press, 1920, pp. viii and xi.

Significant is Dr. Garrison's letter to Dr. E. C. Streeter, dated January 7, 1920, on the occasion of Osler's death. Among other things he wrote: "I feel the dreadful void in our lives which is created by the death of the dear, wonderful good soul that just passed away. What he has meant to me, what he was to me, it would be impossible to express. *Omne individuum ineffabile*, and his was an individuality the like of which has never been seen or sensed before in the medical profession and his like we shall not look upon again. . . . He had the ideal temperament for the Beloved Physician, which he was, in effect. He radiated kindness and good will to all and sundry and there pulsed back great wave lengths of 'the elemental rain of love.' "

Osler's letters are characteristic of the man. In 1920 Allbutt wrote to Harvey Cushing in response to a request for Osler's letters: ". . . Alas! as to letters your path will be a thorny one: he rarely wrote a 'letter' so far as my experience counts; he dealt in flying post cards — two lines of business and half a line of jest or witty comment on current affairs." This, however, is true only in regard to official business matters, but many of his scientific and personal letters are long ones. Cushing reproduced some of them. I have a number of his letters several of them covering about four pages. Like Garrison, he liked to write his letters in long hand on small sheets of paper having only his address printed, and he used many abbreviations which testify that he was writing in haste. His letters reflect his personality and views. Many of his letters are published in this volume for the first time.

When Joseph McFarland, a native of Philadelphia, began his study of medicine it was his determination to become a great surgeon, but Osler turned his interest to internal medicine. He had confided his ambition to Osler and asked him for guidance. "Well", Osler replied, "the first thing to do will be to devote about ten years to pathology." So on completing his service as resident physician at Philadelphia Hospital he decided to go to Germany to study pathology and wrote to Osler about his plan. In reply came Osler's penned letter, saying:

Baltimore, August 31, 1890

Dear Doctor:

Take no introductions abroad — they are not worth the paper. The only introduction a German professor cares a snap of the finger for is to see a fellow hard at work. He will then pay him plenty of attention. Give your card to the professor with whom you wish to

work — to Rindfleisch, Leube in Würzburg — and you will be well received. Both are excellent men to be with. Yours sincerely,
WM. OSLER

When Dr. McFarland published his text on bacteriology in 1896, Osler sent him the following note:

Baltimore, March 4, 1896

Dear McFarland:

Saunders was kind enough to send me a copy of your book on Pathogenic Bacteria. I am much pleased with it, and congratulate you upon the publication of what will be for the students a most useful work. With kind regards, sincerely yours,

WM. OSLER

In 1898, there died in the Medico-Chirurgical Hospital a man whose hands and feet were gangrenous without satisfactory discovered cause. McFarland wrote up the case and published it. Again he received another note from Osler:

Baltimore, August 10, 1898

Dear McFarland, Your case of spontaneous gangrene interested me very much. It is a remarkable condition and the etiology obscure, particularly in relation to Reynaud's disease. I refer, in my textbook, under Reynaud's disease, to a remarkable case published in London many years ago. A very similar case is in this state, in which the woman lost both hands and one leg. I do not remember any instances of such rapid progress as your case.

Sincerely yours,

WM. OSLER

In 1900 and 1901 a smallpox scare occurred in Philadelphia and Camden that led to a great increase of vaccination. This was followed by a remarkable number of cases of tetanus exploited by the newspaper. The circumstances attracted the attention of Professor McFarland who suspected that contamination of the cow-pox vaccine then used was the source of the outbreak. He investigated each individual case enquiring when, where, how, by whom and what vaccine virus was used for the vaccination, and found that all but one of the cases resulted from the use of the same virus. He then published his findings and stressed the disastrous effects from carelessness in the manufacture of the virus and urged the adoption of some system of testing

the vaccine to insure its purity. This end was eventually accomplished, but for the time being his paper aroused a storm of protest. The president of the Board of Health and the chief diagnostician of the Health Department upbraided him for having played into the hands of the antivaccinationists. The Philadelphia County Medical Society censured him, and he was threatened by the vaccine manufacturers with a suit for having injured their business. In the midst of all this condemnation and criticism, he received the following letter of congratulation from Osler:

Baltimore, May 14, 1902.

Dear McFarland, Congratulations on your vaccination paper. That is a good solid piece of work. I do not see that there is any other possible conclusion than that you have reached, that the particular virus has been responsible for the trouble. I wish the Lancet people had seen your paper before they wrote the editorial on Wilson's communication. Send them a copy of your paper at once.

In 1904 came the announcement of Osler's appointment to the Regius Professorship of Medicine at Oxford. When Professor McFarland wrote to Osler, congratulating him on this occasion, then came the following reply:

Pointe-a-pic, Quebec, Canada, September 1, 1904

Dear McFarland, Thanks for your kind note of congratulations. It would be a great wrench to leave all my good friends on this side but it is really a matter of self-preservation.³⁰ I could not long stand the pressure of my present life. I do not leave until next June. I have to congratulate you on your book, *Textbook of Pathology*, with which I spent an hour very pleasantly at the New York Library on Monday. I like the arrangement very much and the illustrations are very good. I was much pleased with the sections I looked over. Sincerely yours,

WM. OSLER

30) Osler, in one of his letters to A. Jacobi, explained some of his reasons for accepting in 1904 a call to Oxford, England. He wrote as follows: "The pressure of the past few years has been too much for me. I tried hard last winter to lessen the work but it seems impossible. If I had only my practice to consider it could be managed, but the teaching, the supervision of the clinic, and so many outside affairs have taxed my strength too much. I have accumulated a lot of good material which I have not been able to work up and for a few years at least I shall have leisure at Oxford."

Dr. James J. Walsh of New York had inquired about the most artistic example of Oxford architecture when he was collecting illustrations for the volume *The Century of Columbus* (1450-1550). Sir William consulted Lady Osler in the matter, and their cooperative choice proved eminently satisfactory. Osler's reply to Dr. Walsh was as follows:

19, Dec. 1913

Dear J. J. W.,

I do not know where your letter of Oct. 11th has been, but it has just turned up at the bottom of a pile. I will ask at the Bodleian what would be the best piece of Oxford architecture of the last half of the 15th century. I should think the superb Divinity School. I will let you know.

I am glad you had such a nice visit. It was awfully nice to see you. I wish you would not appropriate all the reprobate protestants, like Shakespeare, in your wretched old out-of-date community. Why do not you take Bacon and that old rascal Calvin who burnt my friend Servetus!

Sincerely yours,

WM. OSLER

P. S. I have just seen Madam . . . who says the Divinity School is the *thing*. Any Oxford collection will give a picture — or if you wish I could send a recent one.

On October 28, 1914, Osler sent to Professor Walsh the following letter:

Dear J. J. W.,

What an industrious old sinner you are! That is a splendid book. Lady Osler will write and thank you herself. It is full of all sorts of interesting things. I am glad you deal so lightly with that fine character Henry VIII. I wish you could come to our Founder's Day Service at Christ Church. You would then really appreciate what we think of him.

We are seeing a great deal of the Louvain professors, fifteen of whom are here. I see you have got a beautiful picture of the Hotel de Ville.

Again Osler sent to Professor Walsh the following letter:

3/21 [year not given]

13, Norham Gardens, Oxford.

Dear Walsh, I saw that Linacre portrait 2 or 3 years ago. The firm produced in rapid succession panel portraits of many distinguished

16th century physicians — all condemned as fakes! They are doubtful dealers with whom I would have nothing to do.

We are well & busy. Lady O. very full of work — a big shop in one of the Laboratories which does all the repairs & c., & makes bandages for the 1500 patients in this district. I am on the road a great deal — seeing cases in the Hospitals with which I am connected. So much of interest. The nerve strain of this trench war is very severe — it is astonishing to see the variety of functional lesions. Our boy is in the R. F. artillery, but has not yet been at the front. Incidentally I am trying to pick up a little education. I am working at the earliest printed medical books, and am reading some of your old friends. I have just finished Vincent of Beauvais sections on med. The R. Printer's edition in the early 70ties is the biggest incunabula known.

Things are going well here. 'Tis a hard business to stir a democracy. The Irish problem is difficult. The settlement is really in N. Y. . . . Until Hibernia Magna recognizes the folly of Irish Independence there must be trouble.

Lady Osler sends love & best wishes. Yours ever,

WM. OSLER

When Doctor James J. Walsh sent his *Popes and Science* (1908) to Osler, the latter replied:

Sept. 8th, [year not given]
13, Norham Gardens, Oxford

Dear Walsh, Yours of July 9th reached me today. You addressed it Norham Gds., London, & it has been travelling. Thanks for the *Popes & Science*. I have not yet had time to read it as I am deep in my system & revising my text book. What an industrious fellow you are! and you get out such interesting vols. Your 13th Century is splendid. I am sending you a "Linacre" volume about which you will know everything.

When are you coming over? With Mrs. W. we hope. I am not going to Edinburgh. I have never had a winter off & we are going to France & Italy. I shall prowl about the old univ. towns & pick up a little medicine on the way. Sincerely yours,

WM. OSLER

On April 15, 1916, Osler wrote to Professor J. McFarland:

Dear McFarland, I was very sorry to see that my old friend Isaac Ott has gone to his rest. What a good worker. What an example to all of us. I have the warmest appreciation of his fine work, with much of which I kept in close touch. He was most kind in sending me his papers. I hope a memorial volume of the special ones will be issued.

I hope all goes well with you and yours. We are in the midst of a tough job, but are coming through all right. It's hard work to stir democracy. Yours sincerely,

WM. OSLER

I'm glad to see your obituary notice in the J. N. M. Dis. [*Journal of Nervous and Mental Diseases*].

About 1910 the conditions of American medical colleges began to undergo careful scrutiny because of their excessive number and frequently bad quality. Improvement was accomplished by employing "full-time" professors, that is those who devoted all of their time to instruction, investigation and publication. The Medico-Chirurgical College of Philadelphia followed this lead. But about the same time, the development of the Parkway from the City Hall to Fairmount began, and as the Medico-Chirurgical College stood in the way it was to lose its buildings in consequence. After prolonged discussion in which Dr. McFarland was one of the prime movers and exponents of amalgamation of the Medico-Chirurgical College with the University of Pennsylvania, such amalgamation was actually consummated in 1916. On this occasion, on November 21, 1916, Osler sent to Dr. McFarland the following note:

... Congratulations on the amalgamation, the details of which I have been following with great interest. It's a wise scheme. You must be very pleased. All goes well here, but it is a long and weary struggle. We are only in the midst of it, I fear. The sacrifice of life is appalling and we have suffered terribly at the University. Some of our very best young teachers have been killed. I will look out for your book. Greetings to John B. [Deaver] and to all old friends and to Allen J. [Smith] particularly.

Doctor McFarland recounts the following in a personal communication to the writer:

His only child, Revere Osler, was killed in action in the World War on August 30, 1917, through a direct hit upon the artillery unit in which he served. As soon as the melancholy news of this reached me, I wrote to Osler expressing my sincere sympathy. It was a hard letter for me to write and probably was only one of thousands that he received. He, however, dignified it and honored me by answering it very briefly by a note in his own handwriting. It is the most treasured of

all his letters to me. I value it so highly and laid it away so safely that I have been unable to find it to read. It is impossible to do this letter justice without the exact expressions used, but one characteristic sentence remains in my mind. He says with undoubted fortitude, "It was a dreadful wrench."

The following are letters of Osler selected from his correspondence with Colonel Fielding H. Garrison.

13, Norham Gardens, Oxford, 10th [1916?]

Dear Garrison

I have neglected you & many others, but it has been unavoidable. Hopeless mess! Secretary gone, butler & chauffeur too and I have a correspondence bureau to manage, but in such days it is a comfort to be busy. I am awfully in arrears with work. I am struggling with the early incunabula; a new edition & all sorts of interest in the sick & wounded. We are full of para-typhoids chiefly from the Dardanelles. We had a new Harvard unit here the other day. I endorse unit programs, such a nice set of boys. We had a scare about 3 weeks ago — fire in the dining room — 3.30 a. m.; another hour & my mess & books in the room above would have gone. I hope you had a good time with Klebs. Your book has done good missionary work & stimulated interest enormously. His paper in the J.H.B. is most interesting. When do you issue a 2nd edition? I have a few corrections. The country is in good form & the army growing & improving every day; but the war is not half over. Anything but an inconclusive peace. We must either win or go under in which latter case we shall . . . in the struggle to win. Get your ships ready in any case. The navy has saved us. Greetings to the Librarian — to Klebs.

Sincerely yours, WM OSLER

13, Norham Gardens, Oxford — 13. 1. 19

Dear Garrison — I hope by this time you are 'over' & comfortably settled somewhere. Let me know how you are, & I hope before long you will be sent to England. You must come to us, of course, & let me tap your brains about my catalogue. Let me know if I can do anything for you in London & should you wish me to look up rooms for you just send a wire. I am in town very often.

Greetings to you all at G.H.Q. Best wishes for 1919. Love to Streeter, when you see him. I am expecting him here when he gets to England. Yours

WM OSLER

I knew Ballen well & had a great affection for the dear fellow.

A post card addressed to Colonel Garrison.

Sept. 6, '19

Have just heard from Milford that the MS. has arrived. We leave here (Jersey) in a few days so I will have it sent to Oxford. T'will be good bedside reading for me. I will let you know about it soon.

WM OSLER

September 13, 1919

Dear Garrison, I am delighted with the anthology which came last night. It is really a remarkable collection, and one wonders where you got it all. Very many are new to me. I will discuss the question of publication with Milford.

The work would, I think, be greatly appreciated in the profession, and outside for the matter of that. I will write again in a few days; meanwhile send this letter to Casey Wood, about whose address I am doubtful. Sincerely yours,

WM OSLER

30. IX. '19

Dear Garrison, Chapman, one of the Press Secretaries, took Anthology ms with him on vacation, & has not yet returned. I understood from him that the Press will take it, so if you have ideas as to format &c send them on. An attractive volume should be made as the stuff is A. 1. There are one or two I may wish to ship in. C. A. W. [C. A. Wood] writes that he will be with you soon so read this to him. I am writing him on other matters. We had a fine holiday in Jersey. I am trying to revise & partly rewrite my text-book. Greetings to your new chief whom I know. We can give you anything in the way of photographs from Bodley. S. will be delighted to help. I wish we could do more for him. S., here, but there are difficulties — racial! in some quarters. Mrs. S. is a splendid worker.

The B. M. people have given me my early Med. Incunabula list — to 1400 — verified everything & we should be ready to print after Xmas. I have a 40-50 pp. introduction. Yours tr —

WM OSLER

About five months before his death Osler wrote to Colonel F. H. Garrison:

13, Norham Gardens, Oxford.

Dear Garrison, Yours, just to hand, with Oxf. Press inclosure is dated *June* 1, but suppose you meant *July* 1, as the date on Oxf. Pr. letter is June 26th.

Delighted with Antho. [Anthology] idea, particularly as it falls in with an old wish of mine. I will look over the mss. with great in-

terest & I am sure the Press will take it. The sale would be limited in Engl., but in the U. S. there should be a fair demand. I shall be much excited to look over the list & will cut out — if any need! So interested in what you say about Landor, to whom my poor laddie was devoted. An original ed. of the *Pericles & Aspasia* he brought back with him from the Somme trenches. I must look up the vols. as I should like you to have them, with his bookplate.

The presentation was made by Allbutt, who looked & spoke as only my bro. Regius can. He is unique. The vols. look very handsome. My friends have just showered presents of all sorts — the most interesting bibliographically, the 1859 Omar presentation copy from Fitzgerald to Max Muller and the . . . from some of my Colophon club friends. Best of all have been the loving greetings from dear friends in the profession whose devotion has made my life so full & so happy. Yours

WM. OSLER³¹

I have also in my possession several other letters of Osler. One of them is addressed to A. Jacobi in which he praises Dr. Isaac A. Abt's work. In the same letter he asks Jacobi for Rokitsansky's photograph.³² In another letter Osler writes to F. H. Garrison about the importance of defeating the Germans since the military spirit of the German nation is a menace to the world's peace and civilization. This letter confirms Dr. H. Cushing's statement that Osler would have made a good Director of Propaganda.³³

Dr. Thomas Bertram who was Osler's friend since boyhood has communicated interesting data concerning Osler's early life to the *Medical Economics*. Dr. Bertram keeps his office in Osler's former office in Dundas, Ontario, just as Osler left it sixty-six years ago. It consists of the same desk, same medicine-bottles which Osler used; an old school slate on which Osler used to scrawl his appointments. In this office Osler started his practice in 1874. The inhabitants in

31) There is a postscriptum to Osler's letter, which along with some other Osler, Mitchell, Jacobi, and Welch letters that I have, due to limitation of space, I am not including in the present volume. Some of them were published by me elsewhere.

32) Osler had great affection for his teacher, Rokitsansky. On Jan. 28, 1908, he wrote to the late Dr. Maude Abbott: "I have but one regret, that Rokitsansky and Peacock are not alive to see it. Your tribute to R. is splendid. My feelings were the same when I read the monograph." See W. W. Francis: "Maude Abbott — Hero-Worshipper," *McGill Med. Jour.*, Montreal (Oct.) 1940, X, 39.

33) H. Cushing: *Life of Sir William Osler*, Oxford, 1935, II, 458.

Dundas worship the memory of its favorite son, Osler, talk of his youthful pranks, which resulted in his being expelled from the local school, and are proud of his scientific work of making microscopic studies of specimens obtained from nearby swamps. Dr. Bertram relates that one day he found Osler shaving with one hand and at the same time he was holding a book with the other and reading. His impression was that Osler could not cram enough work into every minute. Osler's ability to attend patients amazed his friends. He radiated great interest in their welfare and demonstrated genuine fondness for them.³⁴

Osler was a successful leader and a remarkable personality and was beloved and admired for his charming and unique character. He had a great creative and animating spirit in teaching clinical medicine. His work reflected erudition, versatility, and soundness. His ability and achievements were recognized by his contemporaries in that they conferred upon him numerous honors and the highest positions in the medical world.

Osler died on December 29, 1919. On a tablet set into the rocky walls of the Dundas Valley in Canada the following benediction was inscribed:

Erected by the
Hamilton Medical Society
To Commemorate the Life of
Sir William Osler, Bart.
Student, Philosopher, Physician,
Whose Careful Studies of Nature
in This Vicinity Laid the
Foundation of His Career.
He Said,
"The Master Word is Work."

34) "Private Lives," *Medical Economics* (March) 1940, 60-62.

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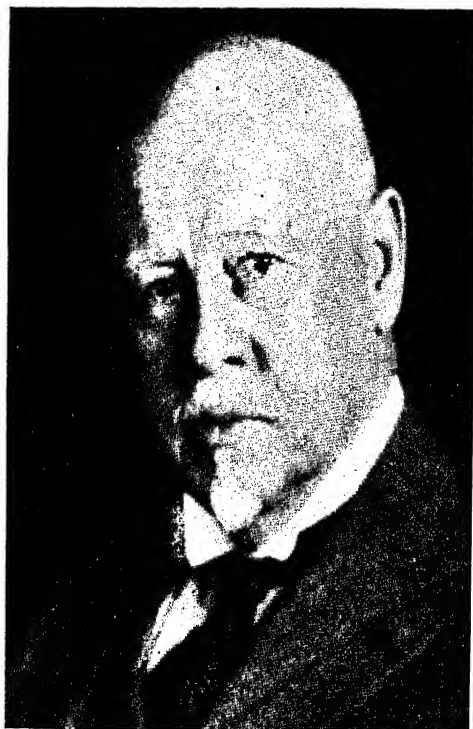
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PROFESSOR WILLIAM HENRY WELCH
(1850-1934)

[Courtesy of Colonel Fielding H. Garrison, librarian,
William H. Welch Medical Library, Baltimore]

CHAPTER XI

DR. WILLIAM HENRY WELCH

(1850-1934)

Human knowledge and human power are co-extensive; for ignorance of causes prevents us from producing effects. Nature can be ruled only by being obeyed; for the causes which theory discovers give the rules which practice applies.

— FRANCIS BACON

A genius in the field of pathology and bacteriology, a leader in public health and social welfare, an ideal teacher and an outstanding organizer was Dr. William Henry Welch.

Welch was born in Norfolk, Connecticut, April 30, 1850. A descendant of a long line of New England physicians, it was natural that Welch should follow the family profession. After receiving his A.B. from Yale University in 1870, he entered the College of Physicians and Surgeons, Columbia University, from which institution he graduated in 1875. Then he made extensive postgraduate studies in Europe for three years under Cohnheim and Ludwig and had contacts with Ehrlich, Koch, Weigert, Pasteur, Lister, Virchow, and other medical lights. In 1878, Welch returned to the United States equipped with a broad foundation in scientific medicine, especially in the field of bacteriology and pathology.

In 1879, he was elected professor of pathological anatomy and general pathology at the University and Bellevue Hospital Medical College, New York, which position he held until 1884. Then upon Cohnheim's recommendation, confirmed by John S. Billings, Welch was chosen by Dr. Gilman, president of the University, as professor of pathology at Johns Hopkins University, the first time such a chair had been established on a full University basis. Upon his retirement from the chair of pathology in 1916, he directed for a decade the

School of Hygiene and Public Health at Johns Hopkins University. In 1926 he occupied the chair of history of medicine. In 1931 he became emeritus professor.

DEAN OF AMERICAN MEDICINE

Dr. Welch's medical contributions materially influenced the progress of American medicine. He introduced the newer bacteriology (of the Koch and Pasteur tradition) and the newer pathology (of the Virchow, Cohnheim, Weigert, and Ehrlich tradition) in this country; made important discoveries in bacteriology; widened the field of medicine in general; and was among the first in the United States to consider pathology as an independent science, that is, as the study of the natural history of disease.

In the words of S. Bayne-Jones, "Doctor Welch's contributions to bacteriology may be grouped in three classes: first, the result of his productive investigations; second, the effect of his teaching in the training of bacteriologists, the education of physicians through addresses at their meetings and the instruction of the general public; third, the material and intellectual aid he gave through his part in establishment of laboratories and institutes in which some of the most fundamental investigations of the bacteria, viruses and protozoa have been made."¹

It is of interest to note that Welch at the age of twenty-five, while working at Cohnheim's laboratory at Breslau, had already made himself known through an original investigation of pulmonary edema. Thus, in 1876, Welch investigated acute edema of the lungs, demonstrating for the first time that pulmonary edema would occur when there was a disproportion between the actions of the ventricles of the heart. In the same year he was the first to state that syphilis was the most frequent cause of aneurysm.

Welch's first important contribution in this country was his study on modes of infection in 1887. He presented scholarly reviews on preventive inoculation against infection, the new knowledge of diphtheria, immunology, tuberculosis, and the relation of bacteria to pneumonia. In 1888, his work, *The General Pathology of Fever*, appeared. In 1889, he reported his studies on hog cholera and swine plague.

1) S. Baynes-Jones: "William Henry Welch," *J. Bact.* (Nov.) 1934, 440.

Of particular interest are Welch's discoveries in 1891-92 of two pathogenic bacteria with which his name is most associated, viz., the *bacillus aerogenes* and *Staphylococcus epidermidis albus*. In 1853 Maisoneuve presented the first classical description of gas gangrene. In 1892 Welch and his pupil Nuttall first described in Johns Hopkins *Bulletin* a spore-bearing anaerobic bacillus which was proven to be the principal etiological factor of gas gangrene. The discovery was the result of an autopsy performed by Welch in 1891 on the body of a man who had died from rupture of an aneurysm in which infection by bacteria had occurred about the time of death. There was no emphysema before death, but it was present in a marked degree at autopsy eight hours later. He found gas in the blood vessels of the cadaver and stated then that the gas was produced by an anaerobic bacillus which he called *bacillus aerogenes capsularis*. It is also known as *bacillus perfringens* and is commonly designated as *bacillus Welchii* in honor of its discoverer.²

The importance of the Welch bacillus came to a focus on the Western Front during the World War where the gunshot wounds created an ideal medium for gas infection. This bacillus was recognized as one of the most frequent causes of gas gangrene in wounded soldiers. Of significance is his second discovery of a special variety of the white micrococcus in the skin named *Staphylococcus epidermidis albus* which infects the edges of wounds from the skin. The importance of this bacteria has been recognized in the surgical clinic as a source of wound infection in the sterilizable field of operation. These discoveries won for him both national and international recognition.

Associated with Dr. Welch in some of his important findings were two of his outstanding pupils, Dr. Simon Flexner and Dr. G. H. F. Nuttall. Welch collaborated with Flexner in a pioneer investigation of the toxalbumen of diphtheria. They demonstrated the pathological changes caused by experimental injection of the toxins of diphtheria (1891-92), simultaneously with Emil Behring. Welch's and Flexner's four papers on diphtheria, published in 1891, 1892, 1894, and 1895, were of great practical significance, as they influenced the profession at that time in establishing antitoxin therapy.

2) Later studies by numerous investigators have shown that *bacillus Welchii* is the most widespread of the known bacteria, that it grows in tissue or laboratory media and that it rapidly destroys tissue by means of its toxins.

Welch made important contributions during 1891. He was among the first to emphasize the value of rapid bacteriological diagnosis of diphtheria. He and Abbott confirmed Löffler's discovery. Welch investigated the pathology of fever, pointed out that the colon bacilli are of little pathogenic importance, and reported experimental production of the typhoid carrier state in rabbits. In collaboration with Dr. W. S. Halsted and others he published a work on skin sterilization and surgical infections.

In collaboration with Dr. Simon Flexner, Welch demonstrated the pathological changes produced by experimental injection of the toxins of diphtheria (1891-92).

In 1892, Welch's papers on the pneumococcus were published in which he described the Welch capsule stain, a modification of Guarnieri's medium. It is of interest to note that Welch at that time investigated the possibilities of protection with antipneumococcus serum.

Welch contributed over 400 papers to the medical sciences which enriched the medical literature. Among them are his original works on the biology of bacteria, dysentery, influenza, fungus diseases, animal diseases, serum diagnosis of typhoid fever, hog cholera, micrococcus lanceolatus, thrombosis and embolism, glomerulonephritis, organic disease of the stomach, and hemorrhagic infarction. Welch's laboratory period came to an end in 1900. During the period from 1885 to 1900 he was not only the inspiring director of the laboratory, but was himself a brilliant investigator and pathfinder.

Beginning with the year 1900 he devoted much of his time to other important medical problems remaining, however, the guide in the pathological laboratory, influencing groups of students and colleagues to further their research work. In this way from 1900 to 1916 he indirectly stimulated the research work in his laboratory at the Johns Hopkins Hospital.

Dr. S. Bayne-Jones remarks "that Dr. Welch probably made some other discoveries but handed them to other men of science for a thorough study." He cites, for instance, the case of blastomycosis: Welch discovered a peculiar parasite in material excised from a patient, but turned the material to Dr. Gilchrist for further investigation. Welch was not interested in securing priority but in furtherance of medical knowledge.

Besides Welch's pioneer work on pathology, bacteriology, and

preventive medicine, he also contributed important original work to medical history and medical education. His lectures and writings on the history of medicine are of particular interest. Through his valuable suggestions, guidance and inspiration many American physicians and scientists considerably advanced the knowledge of various branches of medical sciences and art.

TEACHER AND EDUCATOR

Welch was one of the foremost medical teachers and educators of his time. For more than fifty years he spent his time in teaching medical students, physicians and the public. His lectures, addresses, discussions, and writings, strongly influenced the medical thought of his country. His *Papers and Addresses*, edited in 1920, are a treasure of the medical literature.

The pioneer teaching of Welch began in 1879 when he started his lectures on pathology at the University and Bellevue Hospital Medical College. There he introduced the laboratory methods, the newer pathological technic and doctrines, which launched a new era in medical education in this country. Under his teachings and leadership this branch of medicine became in a deeper and broader sense the natural scientific study of disease.

Dr. Welch contributed brilliant work to medical education. His papers and lectures in this field reflect his broad mind, versatility and clear vision. It is of interest to note that Welch, in collaboration with other educators, is the author of a little book on the ethics of the American Medical Association.³ In the words of Dr. Sigerist: "On every board, on every committee, Welch had his place, a small rotund man, always ready to help, always obliging, honored and loved by everyone."⁴

In 1884 a provisional medical faculty was established in Baltimore where Welch organized a research laboratory in the first building erected on the Johns Hopkins Hospital ground. Here, from 1886 to 1889, Welch gave courses in pathology for graduates, and surrounded himself with enthusiastic co-workers. Welch's chair of patho-

3) The main code of ethics for the guidance of the American Medical Association was written by the eminent ophthalmologist, Dr. Isaac Hays, in 1847.

4) H. E. Sigerist: "William H. Welch," *Bull. Inst. Hist. Med.*, 1934, II. 345-346.

logy was one of the first. In 1889 the Johns Hopkins Hospital was opened; here Welch acquired adequate laboratory facilities and became known as the outstanding teacher and investigator in the United States. Welch's laboratory for a decade had proved a nursery for many workers who subsequently became masters themselves. Welch declined to occupy the chair of pathology at Harvard Medical School, as he foresaw the great rôle of Johns Hopkins University in American medicine. He had confidence in his ability and felt that Baltimore needed him both as an organizer and as a teacher.

Welch participated in the selection of the heads of various departments at the Johns Hopkins Hospital. He possessed a rare ability to detect talents in young men. Consequently he accepted Osler's recommendation to appoint Dr. Howard Kelley at the age of thirty-seven as the head of the Department of Gynecology. He recommended the youthful Dr. Hugh Young to the professorship of pathology at the University of Texas. He also agreed with Dr. Halsted to appoint the same Dr. Young to take charge of the Department of Urology at Johns Hopkins Hospital at that time when he had not yet received special training in this specialty. Later Dr. Young became one of the greatest American urologists.⁵

Welch loved his medical school, was omnipresent, and showed great interest in the work of the younger members of the staff, creating a favorable atmosphere and facilities for their study and advancement. He found time to discuss scientific problems at length with even the youngest members of the hospital staff, and liked to comment on their papers which were published in medical journals. He was affectionately called "Popsy".

Among the early group of graduate students who had worked in Welch's research laboratory was Walter Reed. He took courses

5) Dr. Young won this position as a result of researches which he continued actively afterward. These and clinical inventions and advances have led to the publication of more than three hundred papers and six books. He invented the Young punch and was thus the father of transurethral resection of the prostate which has now been used in many thousands of cases all over the world. More important are his operations for benign and malignant prostates. His radical operation for cancer of the prostate has resulted in the saving of a large percentage of the cases in which it has been employed. As founder and editor of the *Journal of Urology*, and head of the Brady Urological Institute, he has had a great influence in the development of urology and in the training of some of the most distinguished figures in American urology.

in the Johns Hopkins clinic and laboratories where were laid the foundations of the training in bacteriology which first set him to work on yellow fever. In the words of Dr. Harvey Cushing, "All of this led, ten years later in Cuba, in connection with John Guiteras, Carrol, and Lazear, to Reed's epochal discovery of the part played by the mosquito in this once dreaded disease."

In 1926 Welch became professor of the history of medicine, filling a new chair at the Johns Hopkins University, and for five years he was the guiding spirit of that department.

Welch recognized the importance of lecturing on preventive medicine and hygiene before the general public, and on many occasions he fulfilled this task by popularizing the principles of hygiene. Through his addresses and lectures he educated the physicians as well as the general public in the problems of public health.

Welch was teaching not only by lectures and addresses, but also by writing and personal contact. He gathered around himself gifted students and physicians and encouraged them to medical research. Welch's lectures and writings are masterpieces of clearness, profoundness, logic and style. His brilliant articles on pathology and bacteriology served as a source of education and stimulation to numerous investigators.

Welch was one of the most honored and beloved teachers of his generation. His success rested largely upon his broad knowledge, originality, the stimulating character of his teaching and his remarkable devotion. His kind relations with his pupils reflected his generosity, his modesty, his love of science. His pupils have often expressed their deep admiration and lasting affection for their great master. In the words of Dr. Garrison: "Their devotion to the master was that of a group of loyal regimental adjutants to their commanding officer." Dr. Young said: "Dr. Welch's word was law."

Among the impressive list of Welch's pupils were: Gorgas, Councilman, Thayer, MacCallum, Whipple, Blumer, Cullen, Winternitz, Opie, Abbott, Bloodgood, Carrol, Lazear and Walter Reed. These medical men in their respective fields followed the steps of their great teacher and became important contributors to various branches of the medical sciences. In 1900 a memorial work, *Contributions to the Science of Medicine*, was published in honor of Dr. Welch. The work was dedicated by his pupils to him on the occasion of the twenty-fifth anniversary of his doctorate.

Welch won from his pupils, friends, and associates the greatest respect and honor, which, far from seeking, he actually avoided. His letter to Dr. F. H. Garrison, which follows, may serve as an illustration: "I expect to arrive at the Army and Navy Club about seven o'clock, December 13, and will look for you there — I do not approve of meeting people at trains and should not dream of allowing you to do so."

Many outstanding physicians of his time acknowledged themselves as Welch's disciples. For instance, the founder of American pediatrics, Dr. Abraham Jacobi, said of Welch: "My former pupil and present master." Some authors, teachers and investigators sought Welch's wise counsel in various important medical problems. For example, the historian, Dr. Garrison, wrote me that while he was preparing the first edition of his book on the *History of Medicine*, Welch advised him to include no living names, not even his own. Welch had long been in demand everywhere as an experienced teacher, critic, educator and organizer.⁶

In 1886 began an increased activity in Welch's work in the field of medical education. In collaboration with Osler, Halsted, and Kelly in the Johns Hopkins Hospital, and with Mall, Howell and Abel in the Medical School, Welch planned a new type of education and raised the requirements expected of the students. He introduced a reduction of professional didacticism and placed the student in direct contact with materials, patients, and instructors. He played an important rôle in the establishment of full-time professorships and full-time instruction in the clinical departments of the Johns Hopkins Medical School and in other medical schools in the country.

In 1889 Osler, who introduced the English and French tradition of bedside medicine to this country, Halsted, the master of laboratory investigations and university clinic, and Kelly, the skillful surgeon of the pioneer American tradition, joined Welch, the master of masters in pathological and bacteriological sciences, forming the "Big Four". They were responsible for the great success of the Johns Hopkins Medical School which became a great center for the progress of American medicine. Welch's association with Osler, Halsted and Kelly in

6) See S. R. Kagan: *Life and Letters of Fielding H. Garrison*, Boston, 1938, 229-230.

the development of the Johns Hopkins University is commemorated in a Sargent painting.

At that time Welch became interested in the problems of public health and sanitation and appeared as an exponent of the newer preventive medicine. He stimulated other workers to produce creative work in the field of scientific preventive medicine and popular hygiene. In 1889 he described the modes of infection and the relation of external sources of infection to preventive medicine. He delivered many lectures and addresses on desirable sanitary reforms, on general municipal sanitation, and on the relation of water supplies and sewage disposal to public health. Due to his efforts and influence bacteriological laboratories were founded in many cities and states as a factor for preventing infectious diseases. The School of Hygiene and Public Health, founded by Welch in 1917, served as a stimulus for others to establish similar schools. This raised the educational standard of the public health workers and improved the sanitation of the country. Welch, like Milton J. Rosenau, was a pioneer in the field of public health and sanitation.

Dr. Garrison states that the team-work of Drs. Welch, Osler, Halsted, Kelly and their pupil associates made the Johns Hopkins the most efficient and productive medical school in the country and that Welch, through the work of some of his outstanding pupils, created a new school.⁷

Welch brought from the laboratories of Pasteur and Koch the then-new science of bacteriology and planted it in the United States; he helped the growth and development of the new school and observed its productiveness and achievements. On the basis of his observations during a period of a half century, Welch in his address on the occasion of his eightieth birthday stated the following. "America is now paying the debt which she has owed to the Old World by her own active and fruitful participation in scientific discovery and the advancement of the science and art of medicine and sanitation. America has taken a position of leadership in the application of the new knowledge to the prevention of disease and to personal and public hygiene."

Welch's contributions to medical education aroused great interest at that time and inspired many medical educators to raise the require-

7) F. H. Garrison: "In Memoriam: William Henry Welch (1850-1934)," *The Scientific Monthly*, XXXVIII (June) 1934, 579-582.

ments in medical schools and hospitals. Welch, like Abraham Flexner, was instrumental in advancing the standard of medical education in the United States. Welch's pioneer spirit was an important factor in the advancement of American medicine. The reorganization and emancipation of American medicine was largely accomplished by Billings, Welch and Osler.

ORGANIZER AND LEADER

Dr. Welch's activities as an organizer and educator are remarkable. He was an excellent administrator and leader of men, and was able to create institutions which were both successful and progressive. His clear vision, his sincerity, and winning personality insured lasting success to his organizations. Being a versatile scientist he knew what medicine lacked in the United States, and he became a prime mover of American medicine in pathology, and an active cultivator of bacteriology.

Dr. Welch and Dr. T. Mitchell Prudden brought experimental pathology from the old country to the new one. Welch's first pioneer work was the establishment of our first pathological laboratory at the Bellevue Hospital Medical College in 1879. Simultaneously Prudden opened at that time a similar laboratory. These two embryonic laboratories developed gradually into large laboratories and influenced the medical education in this country.

When Welch was appointed professor of pathology at Johns Hopkins University, and later pathologist to Johns Hopkins Hospital, he made his laboratory the center of medical research in Baltimore, produced important experimental work, made discoveries, attracted enthusiastic co-workers, and advanced medical education, preparing an army of medical teachers and investigators for the country. Welch's pathological laboratory has proved a birthplace for the many workers who subsequently became famous.

Welch and John S. Billings were the principal advisers in the early development of the Johns Hopkins Hospital and in the selection of the other three members of the staff — Drs. Osler, Halsted and Kelly.

With the outbreak of the World War, Welch turned to new problems, mainly to public health and education. Thus, he created the School of Hygiene and Public Health at Johns Hopkins University

and was its first director. This school was one of the first of its kind in the world.⁸

Welch did not limit his work in public health to his school, but helped the establishment of other schools of health and hygiene, laboratories and institutions for medical research throughout the country. He inspired great financial contributions for medical schools, hospitals, and similar institutions, and was very successful in this cause, raising over nine million dollars for endowment for medical education and public health.

Upon his retirement from the directorship of the School of Hygiene and Public Health in 1926, Welch created the Institute of the History of Medicine at Johns Hopkins University. He spent two years in Europe in buying books for the new medical library at the Institute of the History of Medicine in Johns Hopkins University. When the library was dedicated in 1930 it was designated "The William H. Welch Medical Library", in honor of its founder.

Welch's collaboration in many organizations helped their growth and success. As a skillful organizer and administrator he placed the created institutions on a strong basis, and then he selected the proper successors. He possessed a gift of accurate estimation of men's ability. Welch's administrative ability was recognized by his being elected to the presidencies of important organizations. For thirty-two years he was chairman of the Board of Scientific Directors of the Rockefeller Institute for Medical Research, in which institution his influence was of great significance (1901-33). For twenty-seven years he was a trustee at the Carnegie Institution (1906-33).

Welch was also active in other institutions which have relation to medicine. In 1898 he was elected president of the Maryland State

8) The first School of Public Health to be established anywhere was the School of Public Health of Harvard University and Massachusetts Institute of Technology, a combined enterprise sponsored by both institutions in 1913. This pioneer school was founded and conducted by Dr. Milton J. Rosenau with the co-operation of William T. Sedgwick and George C. Whipple. The object of this school was the establishment of a formal course of training for public health officers. The School of Hygiene and Public Health at Johns Hopkins University, which was opened in 1918 by Dr. Welch, is of a considerably wider scope, including departments on bacteriology, filterable virus, immunization, epidemiology, health administration, statistics, biology, physiology, chemistry, protozoology, helminthology, and engineering. In fact, other schools throughout the world became interested in public health as a result of these two forerunning schools.

Board of Health, which position he held until 1922. In 1919 he was a member of the American delegation to the Red Cross conference at Cannes, France. In 1922 he accepted the chairmanship of the Health Advisory Committee of the American Red Cross. He rendered to the Red Cross direct service and also indirect to the cause of public health nursing and nursing education. Welch served as president of the National Academy of Sciences from 1913 to 1916. During this period he supplied the government with information concerning scientific resources. He served principally as adviser to the Surgeon-General's office in the field of preventive medicine and public health.

Welch took an active part, usually the initiative one, in various scientific and public health movements of all sorts. In 1903 he, in collaboration with Osler, Thayer, Jacobi, Fulton and Young, secured the passage of legislation for combating tuberculosis in Maryland. In 1908 Welch, with the assistance of Dr. Young, promoted legislation for the protection of the insane in Maryland. In 1914 Welch, Dr. H. Young and Dr. C. H. Jones aided in establishing the municipal hospital in Baltimore. In 1915 Welch organized the Mental Hygiene Society.

Welch participated in all important medical activities in the country. He protected medicine from hazardous factors. Thus, for instance, on several occasions during the last decade of the last century he successfully prevented legislation against animal experiments. He introduced a resolution before the Congress of American Physicians and Surgeons held in Washington in 1894 protesting against any legislation tending to interfere with the advancement of medicine by means of experimentation conducted by properly qualified men. He introduced similar resolutions before other medical and scientific societies. He also carried the chief burden in organizing the public opinion against the antivivisection legislation, so that later, in 1896, Senator Gallinger's bill was defeated. "I was then" — writes Dr. Welch — "president of the Congress of Physicians and Surgeons, and acted more or less officially in that capacity. I think this was as critical a time for animal experimentation as had occurred in this country."

Welch became the recognized leader in medicine and hygiene. In the words of F. H. Garrison, Welch was "the experienced presiding officer at medical meetings and other state occasions."

Welch's leadership in public health became national and inter-

national during the World War in connection with his services to both American and foreign governments. His services to medical education in China and his work on hygiene in Europe made him more and more an international figure. He was frequently consulted by the League of Nations concerning medical problems.

Welch's success as an organizer rests not only upon his dynamic vitality and knowledge but also upon his unselfishness, kindliness and devotion. Dr. Cushing cites a letter from President Theodore Roosevelt to his former Secretary of War, Elihu Root, in which he writes that if there were only more unselfish and public-spirited men in the country like Welch and Osler willing to advise him, his executive life would be simplified.

When in 1930 Dr. Welch's eightieth birthday was celebrated in Washington, President Hoover said of him: "In organizing and directing research and application of medical knowledge on a wider field of prevention of disease, he is among the preeminent few who deserve the title of statesman . . . he has contributed more than any other American in the relief of suffering and pain in our generation and for all generations to come."

MAN AND FRIEND

Welch is considered one of our greatest national figures and benefactors during the last half century. Senator Walcott said that Welch was devoted exclusively to the intellectual life and to altruistic purposes; yet to him nothing human was alien.

Welch was a magnetic figure, honored by the profession and all who came in contact with him, and was the recipient of a number of honors and decorations from American and foreign governments. Throughout his life he exercised a colossal influence on those who were associated with him not only by his broad culture, but also by his friendship, geniality and modesty. He was an excellent conversationalist, and had a sympathetic appreciation of the other man's viewpoint. Men of all classes sought his advice in medical problems, and he showed his generosity of spirit.

Welch was an expert not only in medicine but also in literature and art. In the words of Osler: "He was extraordinarily well versed in the history of medicine, and apart from technical knowledge having

a fund of information on all conceivable topics — from bridge to baseball, from Horace to Herrick."

Dr. F. H. Garrison gave the following remarkable description of his friend and master Dr. Welch: "Endowed with phenomenal vitality or strength of mind and body, extraordinary breadth of vision and a singular tenacity of memory and opinion, his nature was genial, lovable, attractive, receptive and hospitable to a fault. . . . His life of eighty-four years was rich and varied. In succession we find him teaching Greek and Latin for a living at Norwich; the favorite physician of actors, actresses and detectives in New York City; the leading citizen of Baltimore and Maryland; a prominent advisor of the Rockefeller, Carnegie and Milbank Foundations; a major, colonel and brigadier general in the army . . . hoaxing Osler; being photographed with Mary Pickford; crashing through breakers at Atlantic City."

Dr. Victor Heiser writes that Welch faithfully attended the meetings of the Rockefeller boards, of the Carnegie, of the Milbank and other benefactions, and never missed one of his classes. His personality was so vivid that the audience was electrified when he entered the room. He was able to bring color to any medical subject. Dr. Welch made innumerable speeches during his long life, and never used notes for his speeches. Dr. Heiser relates that when Welch was honored by President Hoover on his eightieth birthday, he considered it courteous to have a speech prepared. On the platform he put his manuscript on the desk, and, as he spoke, regularly turned page after page. Later when a reporter asked him for a copy Welch handed over these sheets which proved to be perfectly blank pages.⁹

Welch was on friendly terms with many great American and European physicians, and with some of them he was very close and devoted. Among the latter was F. H. Garrison, who became in 1930 librarian of the Welch Medical Library, Baltimore, upon the recommendation of Welch. Dr. Welch was one of the leaders among the American physicians who won international recognition. As an illustration the relation to Welch of the two greatest English physicians, Allbutt and Rolleston, may be cited. Sir Clifford Allbutt characterized Professor Welch as "the power of stimulate thought." Sir Humphry Rolleston remarked that Welch, the doyen of the Johns

9) V. Heiser: *An American Doctor's Odyssey*, 1936, 277-279.

Hopkins University, was committed to a desperate fight for the freedom of physiological research in the United States.¹⁰

Welch was a humanist. He devoted all his life to science and altruistic aims and he had a broad-visioned love of his fellowmen. His ideal in life was reflected in his steadfast endeavor to alleviate the miseries of the poor and unfortunate. His patronage helped many young and old authors and teachers to advance. It was characteristic of him that he encouraged and helped writers even to his death bed. As an illustration the following letter to me is cited herewith.¹¹

The Johns Hopkins Hospital, Baltimore, October 6, 1933

Dear Dr. Kagan:

Your letter of September 12th addressed to my residence, has only just reached me. Thank you for considering me, but it is quite impossible for me to write the foreword to your book, *Jewish Contributions to Medicine in America*, as I am still laid up as a patient in the hospital following a prostatectomy.

Of course you have not forgotten Samuel Meltzer in your book. He had a remarkable influence in furthering scientific research in both theoretical and practical medicine, especially upon younger men.

Sincerely yours, WILLIAM H. WELCH

Dr. Welch's letters were written in long hand. His extensive correspondence is remarkable for its accuracy, clearness and completeness. A selected number of his letters is given herewith for the first time. The content deals mainly with medical education, medical history, scientific topics and general literature.

In connection with Welch's interest and activities in medical history, it is of interest to publish his following two letters to Dr. James J. Walsh, Professor of Physiological Psychology at the Cathedral College, New York:

10) See S. R. Kagan: "Dr. William Henry Welch," *Medical Record*, New York (April 6) 1938, 318.

11) This letter was a reply to my letter, in which I, on the suggestion of Dr. F. H. Garrison, asked him to write a foreword to my forthcoming book. His letter as well as the address was written in his own hand on the hospital stationery. Later, in February, 1934, he wrote again to me on the same subject, stating that he was in sympathy with my work, but he was unable to write a foreword jointly with Garrison, as his health had become considerably worse. This letter was typewritten on a post card and signed by his secretary.

I

San Domenico Palace Hotel, Taormina (Sicilia)
December 19, 1927

My dear Walsh:

Your nice letter is a cheering message to receive for Christmas, and I thank you sincerely, and reciprocate with all my best wishes and felicitations for you. Professor Sudhoff forwarded your letter, and as you include greetings for him, I am taking the liberty of sending your charming letter to him, as it contains also reference to his own work and some information about your forthcoming publication, which will be sure to interest him.

I had a most profitable and enjoyable week in Leipzig last June at the Institut für Geschichte der Medizin with Sudhoff and Sigerist. Sudhoff, who organized and developed the Institute, still works there, but is no longer director, as retirement on reaching 68-70 years is strictly enforced under the new regime in German Universities. He is succeeded by Sigerist, also an able and brilliant worker in the field of medical history — but the outstanding world figure in this domain is undoubtedly Sudhoff — a truly great man — simple and unaffected in his demeanour, but a sound scholar, an indefatigable worker and a lovable character. He regards his "Paracelsus studies" as his life work. I am sure that you would like Sudhoff immensely, and he is informed about your own valuable studies in medical history.

The Leipzig institute is, I think, the only real *institute* of the history of medicine worthy of the name in the world. My experience confirmed my feeling that a mere "*Lehrstuhl*" — a mere professorship of medical history, is not enough. It needs, just as departments of anatomy, physiology, pathology, etc., its own laboratory or institute with a staff of assistants, equipment in the form of a good working library, etc. There should be on the staff palaeographers, those who can read mediaeval mss., etc., etc. — all this requires a good endowment.

It is my ambition, if the funds can be secured, to create such an institute in Baltimore. I shall hope some time to have the opportunity of talking over these matters with you. I have no claim, as you have, to be a *Fach-historiker*, but I have some ideas about the importance of the subject, not merely as a cultural subject, but as one capable of advancing scientific medicine, and I go so far as to say, capable of making better doctors, and it would make me happy if I can do anything to further these ends.

I have not seen the sketch of me in Scribner's to which you refer, and do not know who could have written it unless it is one of the reporters on a Baltimore newspaper. I am not fond of being "featured"

in this way, and have had no hand in this particular adventure. If you find in the article an incentive for congratulation and for writing me such a delightful letter, these are certainly compensations.

I am having my first Sabbatarian year and enjoying it greatly. After my three weeks' gout-cure (I am the victim at times of unearned and unmerited gout) in Carlsbad, I attended the Internat. Congr. Med. History in Holland in July, and had the opportunity of meeting some of the leading med. historians of Europe, as I did in September also at the meeting of the German "Gesellschaft d. Geschichte d. Med." an Bad Homburg, where Sudhoff was the leading figure and president.

After that I threw off my disguise as a historian and resumed that of a hygienist, accompanying an international delegation of sanitarians under the Health Section of the League of Nations to the conferences and dedication of new State Institutes of Hygiene in Budapest and later in Jugoslavia.

I was called from Ragusa by an invitation to accompany Col. Russell of the Rockefeller Foundation to inspect the various stations for control of malaria in Italy, aided by the Foundation — a tour which took me to the extreme south of Italy along the Calabrian coast — which once was Graecia Magna — and ended in Sicily at Catania. While the rest of the party returned to Rome I am lingering in this charming spot — Taormina — and this delightful and unique hotel — a transformed Dominican monastery with wonderful cloisters, church, and remarkably successful preservation of monastic characters with adaptation to the needs of a luxurious hotel. It is only the jazz music, the dancing, and the fashionable guests, mostly American and English, who do not fit the environment.

I shall spend a month or so in Sicily, and the rest of the winter in Italy before returning to France, Germany and England.

I am immersed in collecting books on medical history for my new department at the Johns Hopkins — my aim is not a bibliophilic collection of incunabula, first editions and other rarissimae — nice to have but beyond my means — but rather a good reference library, with complete sets of journals and studies in the history of medicine, science, and culture in general (quite inseparable — are they not?). I have had great luck in picking up such treasures as all of Daremberg's works, DuCange's *Glossarium* (indispensable for reading mediaeval Latin), Bayle & Hillagus' *Dictionnaire* (Osler's favorite) and two or three hundred books altogether. I have not yet tackled the English or Italian markets. It is a great game, but very time consuming.

This is my first real visit to Italy. I suppose that you know Sicily, but it is new to me and of fascinating interest.

What a delicious theme — "Laughter and Health" — for your new book! I am sure that you will treat it in an entertaining and

original fashion, as you do all which your pen touches. Your idea about the gift of laughter to compensate the handicaps of an erect posture is, I fancy, entirely original and suggestive and I shall be interested in the way you develop it.

You doubtless know the discussions by psychologists regarding the expression of emotions following Darwin's fundamental researches on the subject. I think that you will find in William James's *Psychology* the thesis developed that the emotional sensation is the result rather than the cause of the muscular movements characteristic of the corresponding emotional expression — just the opposite of the ordinary common sense view of the sequence of events.

Then perhaps you may be led into some consideration of what the Germans call *Stimmung*, for which we have no exact English equivalent word — for "mood," "temperament," "disposition," "tone," etc., are all included under "*stimmung*," but not one covers it all. Years and years ago Meynert published a little work which I think was called "*Die Stimmung*," which has always seemed to me highly suggestive. Halsted always wanted his patient to be in the right "*stimmung*," before he operated, and unless it was an emergency would defer operation until this was secured.

All this is probably rather remote from your theme, but it occurred to me when I read the subject of your book.

Do not animals laugh? or at least have muscular actions corresponding to ours in laughter? I suppose the question may be raised: Are we well and happy because we laugh, or do we laugh because we are well and happy? I can foresee the charming literary touches which you will give to your theme — but enough, and I fear too much. My address until next August or September on this side of the water is c/o Brown, Shipley & Co., 123 Pall Mall, London, Eng. All my best wishes for you and yours until we meet. Yours cordially,

WILLIAM H. WELCH

II

The University Club
Fifth Avenue and 54th Street

October 26, 1929

My dear Walsh, I appreciated very much your coming to the dedication and the meetings last week, and Sudhoff expressed to me his pleasure in meeting you both there and again last Tuesday here in New York. You are one of the very few serious students and contributors to the history of medicine and science in this country, and America has reason to be proud of such a scholar.

And now comes your nice letter of October 19 forwarded to me

from Baltimore. I have not yet attempted to fill the gaps in our library relating to medical history and historians in America. I want to show you some time some of the good books which I picked up in Europe during my Sabbatical year — some 3000 items altogether. I knew that you were not completely represented, although I have got some of your writings since I returned, which are not yet catalogued. Of course I want everything of yours, and I thank you very much for the book which you have sent, and which I shall find on my return. That humiliating sudden attack of laryngitis on Friday, the 18th, sent me down to Atlantic City on the doctors' orders, where I have completely recovered. I came to New York Thursday to say good-bye to Sudhoff, who sailed that night on the "Bremen," leaving, I think, a very favorable impression on this side of the Atlantic. I return tomorrow to Baltimore.

With warm regards and best wishes and many thanks, I am,

Very sincerely yours,

WILLIAM H. WELCH

The following two letters were sent by Dr. Welch to Dr. Joseph McFarland:

I

Johns Hopkins University, Medical Department
Baltimore, Aug. 13, 1897

Dear Dr. McFarland:

I did not intend to leave the impression that the serum test should be made only with high dilutions. My suggestion was that the test should first be made with low dilutions, say 1 to 10 or 1 to 15, and that in all doubtful cases and whenever scientifically precise results are desired a dilution of at least 1:50 should be employed with 2 hour time limit, the point being that with dilutions lower than 1:50 positive reactions are occasionally observed in non-typhoid cases. Thus far dilutions higher than 1:50 have not given positive reactions save in typhoid cases, but further experience may necessitate putting the upper limit still higher.

My paper in Philadelphia should have appeared in the *Journal of the Am. Med. Assoc.* before this. I read the proof of it some time ago, and think that its appearance will hardly be delayed beyond this week. Very sincerely yours,

WILLIAM H. WELCH

II

The Johns Hopkins University, Department of Pathology
Baltimore, Maryland, April 16, 1910

Dear Dr. McFarland, I find on my desk this morning a copy of the second edition of your *Text-Book of Pathology*, and I thank you very much. The work appears to have been thoroughly revised, and makes an attractive and very creditable appearance. It is my custom to call the attention of my students to your text-book, which has many good features. A text-book is fortunate which survives the first edition, for then successive revisions permit improvements, and I congratulate you upon this survival of the fit.

Very sincerely yours,
WILLIAM H. WELCH

Dr. Welch carried on an extensive correspondence with Dr. F. H. Garrison. Selected letters of this remarkable correspondence are given herewith.

I

807 Saint Paul Street, Baltimore
January 22, 1915

Dear Garrison,

I have just written Dr. Frank Baker, asking if he will not speak at the Vesalius meeting of our J. H. H. Historical Club on Monday evening, February 8. It would be delightful if he could come, and perhaps you can add a word to reenforce the invitation. He could take up any side he desires — contributions, on life and work, relations to contemporaries, etc. As usual I can talk around the subject. The only other speaker will be you. I am sure, the audience would be interested, if you could repeat your exhibition of the iconography, perhaps including some of the Cushing's things if you have them. I hope that you can dine with me at the Maryland Club at 6:30 on February 8th. The meeting is at 8:30. Very sincerely yours,

WILLIAM H. WELCH

II

Baltimore, July 13, 1919

Dear Garrison, When I went abroad in March I left with Dr. Frank Billings a list of 100 names to contribute to the expenses of General

Gorgas's bronze bust, which was presented on March 7 to the Surgeon-General's Library. After refunding the amount which I have personally paid to Mr. Baker, the sculptor, for the bill of his expenses (\$267.50) and in addition paying Mr. Baker a honorarium of \$50.00, I find left in my hands a surplus of \$163.50. I am seeking advice about the disposition of this surplus. It hardly seems worth while to return to the donors the small amount which each would receive. If it were possible to get together in a booklet an account of the presentation exercises with the addresses then made and a photograph of the bust as a frontispiece, I should think this may be the best use of the surplus but I do not suppose the amount would suffice for this and Billings thinks, and I agree, that it would be impossible to get the addresses. Failing this, it has occurred to me that the money might be used for the purchase of books for the library with perhaps a bookplate, which might be given to General Gorgas. Perhaps the library might find some other use for the money, which would be a kind of memorial for General Gorgas, possibly a tablet commemorating the yellow fever work of the Army Commission (Reed, etc.) with mention of General Gorgas's share. If books were purchased, I should think these might relate to yellow fever or tropical diseases or sanitation. I dare say other suggestions may occur to your fertile brain. I should like to send you a cheque for the amount (\$163.50), but perhaps it should go to the librarian, and I do not recall who has been appointed.

I am leaving in the morning for Bedford Springs, where I expect to be for two weeks, taking the cure. Please drop me a line there — Bedford Springs Hotel, Bedford, Pa. With best wishes, I am, Very sincerely yours,

WILLIAM H. WELCH

III

Baltimore, September 13, 1919

Dear Garrison, Thank you for your two letters, both the typewritten and the *manu propria et plana*, which arrived this morning, having been forwarded from Atlantic City. I left Atlantic City on Monday last for New York, and reached Baltimore Tuesday night.

I am enclosing the original letter from the president of the Royal College of Physicians, Edinburgh, with the illegible signature, in the hope that you may be able to decipher it. I have been applying the Edgar Allan Poe principles. The surname begins, I think, with either "P" or "F", contains two "i"s and ends with either "f", "s" or "p". My guess is "Philip", and if this is correct the initials should be "R. W. P.", as R. W. Philip is the well known tuberculous authority in Edinburgh. Perhaps you can learn whether he has been elected presi-

dent of the College since the publication of the British Medical Directory, where you found Russe to be the name of the president. There is no excuse for indecipherable signatures. The Japanese etiquette demands beauty and legibility of chirography in ratio to your esteem for your correspondent. This accounts for the perspicuity and loveliness of my handwriting whenever I wrote you.

I shall be only too happy to accept for that dinner with you and Noble at the Blue Restaurant, but for a while I must be here to have my boils surgically dressed by Follis, and to receive my staphylococcus vaccine, which I have started. Being an advocate of this treatment, it seemed best to start it when the last boil had appeared, so that there could be no chance of failure of the treatment and all the credit might be given to it.

I enjoyed very much our evening together in Atlantic City. . . . I had a delightful little visit with Noble on Wednesday. I am very much attached to him and have the highest opinion of his character and ability. He has left his mark on whatever he has undertaken, and while I hardly suppose that the job of librarian will permanently satisfy him, I have no doubt that he will take up the work with his usual energy and success. It is a position which brings him into contact with the profession of the country, and no one did as much as he in stirring up the profession with patriotic duty in the war.

Please return the enclosed letter. Very sincerely,

WILLIAM H. WELCH

IV

Baltimore, August 1, 1920

My dear Garrison — I returned yesterday and find your letter and editorial "American Physicians in the Hall of Fame," which I am very glad to get. I thank you for telegraphing me Thorxington's address. He has prescribed new glasses which are a great improvement on the old ones. I have also had Mr. Walcott, my nephew, consult him about his young son's eyes. Thorxington was most cordial and I was most favorably impressed in every way. I owe you a great deal for letting me know about him, and Thorxington was much gratified when I told him about you.

I am greatly interested in your article on Physicians in the Hall of Fame. I have been an elector from the start and after the death of Billings and Weir Mitchell remained the only representative of the medical profession. As the fifth election was approaching I wrote to Robert Underwood Johnson (now in Italy), the director of the Hall of Fame, suggesting that if vacancies existed two or three more physicians should be added to the list of electors and I mentioned a number of names to choose from, enclosing one of the Mayo's. Rather

to my surprise both of the Mayo's and no other medical names were added, so that at present of the 102 electors there are only three medical men. You can judge of the chances of selecting a physician for the Hall of Fame. Hitherto only Rush and Morton have received more than a few scattering votes out of the group of physicians and surgeons nominated. I have from the first cast my ballot for both of these names.

Of course the introduction of surgical anesthesia and the discovery, together with its application, of the origin and mode of spread of yellow fever are America's two greatest contributions to medicine, and both should be perpetuated in the Hall of Fame. To be eligible, one must be dead for at least ten years, and I think a larger period should elapse. I nominated and voted for Walter Reed this time, but it will be some time probably before his claims can be properly presented before such a body as the electors.

Morton this time alone among physicians received in the preliminary ballot, in which electors are divided into groups and vote only for names belonging to their group (in this instance scientific men), the coveted initials M. J. F. (more justly famous), which necessitate for election only a majority vote, whereas others must get a two-thirds vote.

I have been more interested in Morton than in any other candidate of the medical group, and he would doubtless be elected, if the electors were not bombarded with documents, circulars, letters, setting forth the claims of Long and Jackson. If the mind of the profession is confused about the rival claimants, how much more the lay mind! I wish there could be more of a consensus of opinion in the profession and, as obviously only one name can be chosen for the Hall of Fame, agreement should be reached to press that of Morton. One trouble is that Morton is a most unheroic and unattractive figure and there is a good deal of justifiable prejudice against him, but the historic facts lead to recognizing him as deserving the chief honor for introducing surgical anesthesia.

You can have no idea of the organized as well as individual efforts which are made to get men and women into the Hall of Fame. There are organizations formed to press the claims of individuals. I have received at least fifty letters from the Governor, officials and citizens of Albany in behalf of Phil Sheridan, about as many for Thomas Paine, and so on down to the inventor of the paper collar, and of course all the other electors are equally bombarded.

Billings never would vote for Morton. He said Collins Warren deserved the credit. I do not know how Mitchell voted, but they were both Brahmans, and could not abide such a man as Morton. George Simmons opposes electing Morton as a physician and crediting him to the medical group.

Your comments on fame are delightful and your suggestion of

names of famous American physicians admirable. I should add to your list the names of Nathan Smith and John Collins Warren, the latter largely for his share in introducing surgical anesthesia. I think also I should include Jacob Bigelow, who is a great favorite of mine. But, as I have said, my vote for the present goes to Rush, Morton and Reed, and until these are elected there is not much use in considering other names.

Simmons has struck off some reprints of Haupt's Babylonian poem, of which I enclose one for you and one for the Library. Haupt has given me a wonderful clay tablet, just like those in museums, with the cuneiform inscription engraved on it. Yours sincerely,

WILLIAM H. WELCH

V

Baltimore, August 15, 1920

Dear Garrison, As I was about to seal the enclosed letter to Russell, it occurred to me that I should like you to see it. Will you please forward it to Russell.

While in a critical mood I am wondering whether you are right in the orthography of "Imeros," which appears in the Contents of your *Anthology*. Should it not be "Himeros," if printed with Latin letters? Otherwise, by analogy, we should have "Istory," "Ieratic," etc. I am not inclined to offer as an explanation for the slip, if it is one, a statement which amused me very much in the admirable report on the physiologic effects of alcohol by the committee of which George Newman, Sherrington, Mott, etc., were members, that one of the early symptoms of even mild intoxication by alcohol is a tendency to drop "h's".

I enjoyed immensely reading your "Foreword" to the *Anthology* and am eager for the book to appear. I have a great love for certain poets. My favorites are of the seventeenth century. There are lines of Landor and of Matthew Arnold which to me have a peculiar magic. I hope that you have Landor's magical verses on Dirce :

*Stand close around, ye Stygian set,
With Dirce in one boat conveyed
Or Charon, seeing, may forget
That he is old and she a shade.*

even more wonderful, I think, than Rose Aylmer! In contrast Shelley has the magic of poetic fancy, but is singularly devoid of the magic of words. Wordsworth can combine both, as in "The Solitary Reaper," and so in a very different way can Keats.

I sincerely hope that you will get a regular Commission in the

Army. Is there any thing which your friend can do?

I have been lingering on here in order to attend General Gorgas funeral, after which I am going to Narragansett Pier. This was Robert Fletcher's favorite summer resort. Why not resume the tradition?

With best regards, I am, very sincerely yours,

WILLIAM H. WELCH

VI

Baltimore, February 27, 1921

Dear Garrison, I am delighted to receive *A Physician's Anthology*, and congratulate you and Casey Wood upon this most charming and admirable production. It is in such a handy form and so attractive in appearance as well as in contents that it should have great success.

In glancing over the volume I am struck by the omission of many of the familiar and rather hackneyed short poems to be found in most anthologies, and this I think a merit. Am I mistaken in thinking that you and Wood have been guided a good deal in making the selections by the sanity and clarity and interest of the thought as much as by poetic merit as revealed by fancy and imagination, otherwise I can hardly account for so many of Lecky's rather pedestrian verses? I am glad to see Campion represented, for he has been much neglected and he is one of the best song-writers, and withal a member of our profession.

In a *Physician's Anthology* I should like to have seen Poe's "Haunted Palace," even if a medical subject, like insanity, does not constitute a claim. But it is very unfair for any lover of poetry to suggest what he might like to add or to omit from an anthology, when he is presented with such a feast of good lyrical poetry as your volume contains. I shall carry the book around in my overcoat pocket for a while, and shall try to avoid Osler's habit of leaving books in the street cars. With many thanks and many congratulations, I am,

Very sincerely yours,

WILLIAM H. WELCH

P. S. Speaking of Lecky, it was cruel to put "A Woman's Portrait" next to its model "She Was a Phantom of Delight".

W.

VII

Baltimore, November 13, 1921

Dear Garrison, Many thanks for the copy of the kind edition of your *History of Medicine*, and also hearty congratulations upon the

well deserved success of this, the best history of medicine in English and the best within its scope and plan in any language. Like Bernard Shaw you are an accomplished writer of prefaces, which make mighty good reading. Your list of types for the children of the future on page 9 is delightful. Evidently they are to be possessed of the *joie de vivre*, and I agree.

I chanced to turn to the pages on Chinese Medicine (pp. 65-69). The statement about the Rockefeller Foundation taking over the medical establishment of Nanking is not quite correct. This establishment was given up and most of the teaching staff transferred to the medical department of the Shantung Christian University at Tsinan-fu in view of the expected development of a medical school in Shanghai under the auspices of the China Medical Board of the Rockefeller Foundation, which purchased with this end in view the property of the Harvard Medical School in Shanghai, as well as additional land for a site. Another and equally important consideration in abandoning the medical school in Nanking was the substantial aid given to the medical college in Tsinan-fu, where the teaching is in Chinese, many of the medical missionaries strongly advocating this, and it seeming desirable to have at least one good Chinese-teaching school of Western medicine. Later developments have led the Chinese Medical Board to announce the abandonment of their intention to establish a second medical school in Shanghai. They have their hands full in developing the one school in Peking, and incidentally aiding with grants various colleges and hospitals, mostly missionary, in China.

Harold Balme's recent book, *China and Modern Medicine*, London, 1921, is very interesting and accurate in all that relates to medical missions in China, and, although written from the missionary point of view, is valuable for its historical matter on Chinese medicine.

You may be interested in the enclosed account, which I have copied from the journal of my recent trip to China, of Dr. Douglas Gray's experience with a Chinese doctor. My impression is that he published this some years ago in the *Lancet* or other British medical periodical.

I returned ten days ago from a very interesting and enjoyable trip to attend the opening exercises of the Peking Union Medical College and Hospital. In 87 days from Baltimore and back I covered over 22,300 miles, and managed to get in three days in Manila with Heiser as mentor and guide. The policy of turning all the government and educational positions over to the Filipinos has been disastrous, and Wood will have a hard time to undo the mischief; indeed, he can only bring some amelioration, not effect a cure.

I hope to have a chance of seeing you and telling you some of the experiences. I trust that you found Nantucket a pleasant place for your vacation, and have come back refreshed. Very sincerely yours,

WILLIAM H. WELCH

VIII

The Johns Hopkins University, School of Hygiene
and Public Health, Baltimore, Md.

November 10, 1925

Dear Garrison, I am really overwhelmed with the beautiful review of my Sedgwick lecture with its [*i. e.*, my lecture] absurdly pretentious title. I have jotted down one or two slight changes, and should love to have it published. I have some notes somewhere which Christopher Johnson, Jr., gave me on Assyro-Babylonian medicine — very interesting along the lines you indicate.

I have come into possession of Marx's *Origines Contagii*, which Oliver, who had just obtained it, has given me. It is the first edition, 1824. I think yours must be the second with *Additamenta*, as it is thicker although smaller format than mine. It is a mine of information, but I should never dream of having it translated. Have you read Husemann's delicious biography of Marx (*der alte, der einzige*) in *Lex. hervorrag. Aerzte*? Evidently M. did not leave his fortune to H.

Possibilities of realization of a medical library building, with history of medicine chair included, seem bright. I am to see the architect tomorrow.

Canby has cut my review of Cushing's *Osler* down about one-half to make it fit the *Sat. Rev. of Literature*. I returned proof yesterday. There is a chance it may be published complete as a separate pamphlet if Canby consents.

That seclusion for a couple of days in your room was honeydew and the milk of paradise. Ever sincerely yours,

WILLIAM H. WELCH

IX

Feb. 22 [year not given]

Dear Garrison:—Would you be good enough to read the Rev. Dr. Tyson's article on the "Caduceus" and return it to him in the accompanying envelope? I have written him that I am asking you to look over the article, and that possibly you may have some comment or advice to give him. I advised him to publish it, suggesting *Journ. A. M. A.*, or *The Military Surgeon*, or *Annals of Med. History*, or *Bulletin of the N. Y. Acad. of Med.* I also referred him to your three papers cited under "Caduceus" in *Index Catalogue*, Ser. 3, and told him you are much better informed than I am on the subject.

I see the Reverend Dr. Tyson occasionally at the University Club, N. Y. If you will look up his name in *Who's Who*, you will see he

has a rather remarkable record; otherwise I do not know much about him, but he is evidently a scholar, and I thought you would be interested. Yours,

W. H. WELCH

X

Dear Garrison — I do not understand this bill. It is barely possible, although improbable, that I may have asked to have the library put as a member of the Assoc. of Life Insurance Medical Directors, in order to receive their publications, which we probably should have in the Library. I certainly have not personally ordered the Proceedings, and the bill should be paid by the Library or else the book returned. Yours,

W. H. WELCH

Feb. 22

XI

Dear Garrison, Will you please complete the address of Major Denit on the envelope and mail it.

Col. Duncan has it in for Shippen, who succeeded in reorganizing the Medical Corps after Morgan's failure, and was entirely acquitted of the charges brought against him later by Morgan and Rush, who made all the trouble for him they could.

I am going to New York today, and expect to return by Saturday. Will you not dine with me Saturday? I shall drop in here for you a little before seven. Yours,

W. H. WELCH

XII

Dear Garrison — I see by the program of the American Bacteriologists (page 5 — enclosed) that you are to address them on Tuesday, Dec. 29, at 5 p. m. Possibly you might get out some books or portraits or both to exhibit

I thought your dinner last night particularly delightful and successful. Everybody seemed to enjoy it and I think the medical officers were cheered up immensely, and they needed it in these blue, chill days for the military.

I hope that you did not mind my introducing you as harboring the delusion that you are a mental and physical wreck daily after 4:30 p. m. As you were able to convince others that what was left of you was superior to the endowment of most persons at their best.

Yours sincerely,

Dec. 18

WILLIAM H. WELCH

XIII

June 6th [1931?]

Dear Garrison, I am leaving tonight for New York, where I shall be at the University Club, 1 W. 54th street, for a week or so.

If there are any letters or telegrams which you think I ought to see, please forward them, or, if you prefer, answer them yourself.

I am dumping on your desk books, pamphlets, catalogues, which should go on the shelves of the library. Sincerely yours,

WILLIAM H. WELCH

The following are letters of Dr. Welch addressed to Prof. Lewellys F. Barker of Baltimore.

I

807 Saint Paul Street, Baltimore, October 21, 1913

Dear Barker,

Thank you for your letter, than which nothing could be finer in spirit. I sincerely hope that it may be possible after all for you to accept the position, if the General Education Board should grant our request.

I shall of course make no use of your authorization to present your resignation of your position as Professor of Medicine unless this expresses your final decision and then not until it may become necessary. In any case I consider it our good fortune and privilege to make the best possible provision for the continuance of your services to the University and Hospital. You need no assurance of the high estimation in which I hold you and your work. With best wishes, I am, Ever cordially yours,

WILLIAM H. WELCH.

II

Baltimore, Feb. 22, 1917

Dear Barker, While I have thanked you, I have not told you how deeply impressed I am with your splendid work on *Clinical Diagnosis of Internal Diseases*. I have looked over the volume and read parts with some care. It is a great work and cannot fail to be of immense service. It will add to your fame and I am proud that such a work has come out of the Johns Hopkins Medical School. It is bound to have a great success.

WILLIAM H. WELCH.

III

Maryland Club, October 2nd, 1919

Dear Barker, I was so sorry to miss you when you called. Brent Keyser has given me such a wonderful account of your summer home and life that I know that you must have had a delightful vacation. He made me quite envious that I could not accept Mrs. Barker's hospitable invitation.

My attention since the middle of May has been much occupied with boils, which have persisted until recently. July I spent at Bedford Springs, August and early September at Atlantic City. On returning I started September 10 with autogenous staphylococcus vaccine treatment and no boils have appeared since then and the old ones are about healed. I think the time to start the vaccine treatment, if concerned in demonstrating its efficacy, is when you are confident the last boil has appeared; then there will be no failures. I was not much pulled down by the furuncles, but they prevented taking trips or travelling about much. . . . With best regards to yourself and Mrs. Barker, I am, Very sincerely yours,

WILLIAM H. WELCH.

IV

The University Club, Baltimore, May 12, 1930

Dear Barker — I have forged your name as proposer of Garrison for resident membership in the University Club, and Harry Friedenwald's as seconder. All that is necessary is for you to write a letter addressed to the Board of Governors recommending Garrison. Principal data (found in *Who's Who*) are: Fielding H. Garrison — M.D. (Georgetown Univ., 1893); A. B. (Johns Hopkins — 1890); Colonel — U. S. Army (probably will retire before long). Assistant librarian, Surgeon-General's Office, 1889; Librarian, Welch Medical Library, 1930. Author of *History of Medicine* & most distinguished American Medical Historian. Gentleman and Scholar, &c., &c. Garrison is occupying temporarily d'Irsay's apartment, 20 E. Monument Place. He will take hold permanently of his duties here in a few days. He is of course a very great addition to our Hopkins group. Perhaps you and Mrs. Barker will have him out for a luncheon or dinner some day. He is, as you know, a very cultivated man. I do not know whether he proposes to bring his family from Wahsington — certainly not before autumn.

I was sorry that I could not accept for luncheon yesterday, but the Singers were still here. They left for Philadelphia and New York today. His lectures were a great success. I am going to New York Wednesday or Thursday for the Harvey Society Anniversary (25 years). Very sincerely yours,

WILLIAM H. WELCH.

From Dr. William H. Welch to Mrs. Lewellys Barker.

Dear Mrs. Barker, I am delighted to accept [your invitation] for luncheon on Sunday at one-thirty. I had a glimpse of Dr. Pirquet in New York last Saturday, and it will be a great pleasure to see him and Mrs. Pirquet here, and best of all you and Dr. Barker.

I had a very interesting and enjoyable, although hurried trip — 22,300 miles in 87 days! The Davidson Blacks sent their best remembrances to you and Dr. Barker. They are delightful, and I remembered having met them at your house. You must plan a trip to China and Japan. I am sure that you both would enjoy it immensely. Very sincerely yours,

WILLIAM H. WELCH.

November 17th [1921?]

Welch was short, rotund, with the massive head and brow of the essential scientist. He was a person of great charm with a shining personality, and twinkling eyes. His wisdom was impressive, his humor was captivating, and his friendship was abiding. Welch lived alone and had his meals mostly at the Maryland Club. He was always so busy that he sometimes had to hide himself in order to get rest and to be able to work in a quiet atmosphere.

Welch was the founder of the *Journal of Experimental Medicine* in 1896, and became its first editor. Dr. Young tells that Welch never had a private secretary, and was swamped with letters, many of which were not opened for months. Dr. Young was once admitted to Welch's library, and found that there was no place to sit down, as all the eight chairs in the room were piled high with mail, most of it unopened, and his desk was overwhelmed with letters, and manuscripts. There was, however, one little corner of his desk pad which was vacant, leaving just room enough to place a small sheet of note paper. Welch often failed to acknowledge the receipt of many letters and manuscripts, as his numerous activities absorbed all his time.¹²

Dr. Welch developed prostatic disease in 1932, and was first treated by Dr. Charles Bidgood in Hartford by catheterization, and then by Dr. Hugh H. Young in Baltimore. The latter discovered a carcinoma of the prostate confined within the capsule, but due to the advanced age of Welch a radical operation was not undertaken. Later,

12) See H. Young, *A Surgeon's Autobiography*, Harcourt, Brace & Co., New York, 1940, 65-66.

in February 1933, hematuria and other serious complications resulted. While Dr. Young was in Florida, Dr. Colston performed transurethral electrical resection of the obstructing prostatic masses, but this procedure was not successful and the bladder became infected with *B. coli*. A month later, Dr. Young removed some rounded lobules by the punch instrument through the urethra. However, the obstruction was not completely removed, and Welch continued to have high fever. Under appropriate treatment, he gradually improved, but he continued to have an infected left kidney. On April 17, 1933, Dr. Young carried out perineal prostatectomy, under spinal anesthesia, and removed the carcinomatous lateral and median lobes. After this Welch enjoyed a long comfortable period. In June 1933, he had an attack of gout which he himself treated with colchium. In November, 1933, he again began to have great difficulty of urination, so that Dr. Young inserted an indwelling catheter and Welch continued to feel comfortable. On April 22, 1934, Welch suddenly became comatose, and it was difficult to arouse him at times. From then on he had fleeting moments of mental clarity. He started to have occasional involuntary muscular movements, but most of the time breathing was rather labored. On April 30 morning, period of apnea came on, continued throughout the day and late afternoon respiration ceased.

Dr. Young communicated to the writer his recollections of the life of Welch during his last year:

"The Metropolitan Opera was here at this time [in March, 1933, while Welch was confined at the Johns Hopkins Hospital], and I called upon Dr. Welch the day his blood urea was 128. I expected to find him semi-comatose or at any rate drowsy from the uremia, but on the contrary I found him quite bright. He immediately began to question me about the operas. He remembered quite well the ones we were having, and discussed the relative merits of Lily Pons, Grace Moore and Bori, but said 'Emperor Jones, in which Tibbett sings, is really no opera, it's an extravaganza. It's a shame such a fine voice as his is allowed only one fine aria.'

"In April, 1934, the urine became blood-tinged, the blood urea rose to 88, the hemoglobin was 48 per cent, but Dr. Welch remained in good spirits and chatted with all his friends. All this time he read the current medical journals, and one day happened to see an article describing cases of agranulocytosis

resulting from the use of allonal, which he had been taking for a long time to improve his sleeping. He immediately insisted upon taking another drug.

"Never, at any time, did he take his case seriously. Never did he ask any questions about the pathology or attempt to direct the treatment or even suggest anything. Hematuria seemed to give him no concern whatever, and he was the most remarkably docile and co-operative patient I have ever seen. His nurse assured me that he never suspected for a moment that he had cancer; and his gayety and enthusiasm, on seeing friends, convinces me that he did not suspect the malignant nature of his condition. Even when the left kidney became hydropyonephrotic, and the uremia gradually increased, he remained bright and cheerful, interested in everything that was going on and ready to discuss politics, music, medicine. He was always tremendously interested in the new cases on the ward.

"Although progressively he became more and more uremic, he had no nausea, no vomiting, no pain, and gradually passed away as peacefully as anybody I have ever seen, just about eighteen months after I had first seen him. During this long period thousands of people tried to see him, and several hundred were permitted by him to visit him. In many instances he talked a long time, and seemed to enjoy particularly his old comrades and friends. He used to love to talk about his early days in Germany, at Bellevue, and the time that he came down to organize the medical school here. He was full of jokes about all these periods, and it was indeed most interesting to talk to him. For a long time after he was admitted here, he took a great interest in the hospital and problems of organization, administration, treatment of cases, research, and new discoveries. Although suffering from a rapidly increasing malignant disease, he suffered very little and remained mentally clear and bright until two weeks before his death."

In reviewing Welch's medical achievement as a teacher, investigator, educator and organizer, we see that he was one of the greatest of American physicians. He advanced pathology, bacteriology and public health in the country; founded laboratories for medical research; created the School of Public Health and Hygiene; founded the Institute of the History of Medicine and its medical library; helped the founding of the Rockefeller Institute of Experimental Medicine; inspired medical education; and stimulated great endow-

ments for medical schools, hospitals and public health. An interesting evaluation of Dr. Welch's work was given, among others, by the following authorities:

Sir William Osler writes: "No man of his generation in the United States has so deeply influenced the profession, not only by his administrative ability and his stimulating work in pathology, but much more by a personal unselfish devotion to its highest interests."

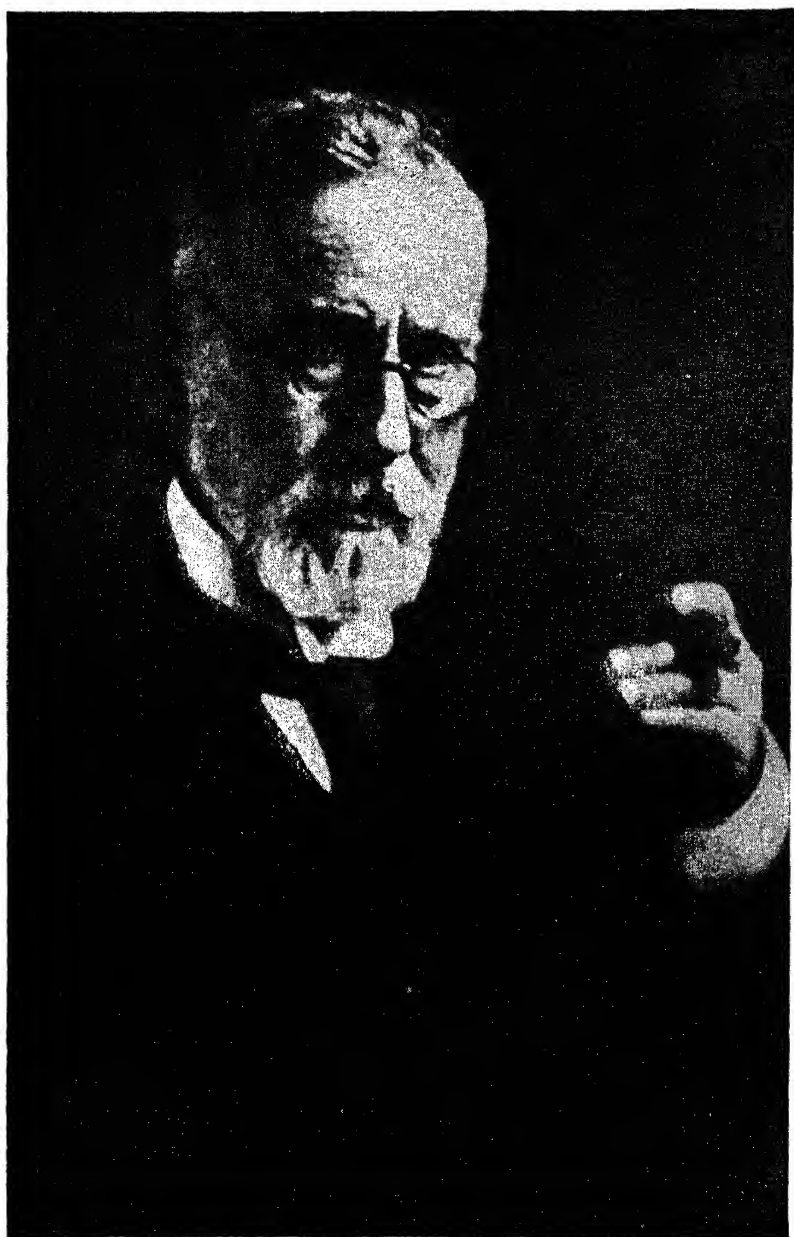
Dr. Simon Flexner divides Welch's half century of scientific life into three main periods: "The first covered thirty years, during which he was professor of pathology. The other two periods covered ten years each, during the first of which he was director of the School of Hygiene and Public Health, and during the second, director of the Institute of the History of Medicine. In all three of these significant undertakings he was a pioneer, both creating the opportunities and showing the way in which they could best be used."¹³

Dr. Fielding H. Garrison remarks: "As a prime-mover of American medicine, he was the natural, lineal successor of Billings, Weir Mitchell and Jacobi, whose leadership had been tacitly recognized, in turn, and never disputed. Thus Welch was leader, prime-mover and activator to the last."

Such genial leaders as Doctor Welch do not come often in human life. The humanistic quality of their greatness and their accomplished work has brought them universal recognition. Welch's name is an honor to his teachers and pupils, to his profession, to his country and to mankind. Welch's medical work during a half century stands as a monument to American medicine. This period is one of the most remarkable chapters in the history of American medicine, representing the epoch of the establishment of pediatrics as a specialty (Jacobi), experimental research in neurology (Mitchell), experimental studies in scurvy, rickets and vitamins (Hess), laboratory research and leadership of preventive medicine in the world (Welch). It is well that the future generations should be familiar with Dr. Welch's biography and work, which may serve as a source of inspiration and an illustration of the life of a sage and leader.

13) S. Flexner: "Doctor William H. Welch, 1854-1934," *Science*, LXXIX (June 15) 1934, 529-533.

W. C. Burket published the *Bibliography of William Henry Welch, M.D., LL.D.*, Baltimore, Johns Hopkins Press, 1917. The sources of biographical information are: S. A. Knopf, "In Memoriam: Dr. William Henry Welch," *Med. Rec.* (Sept. 19) 1934, 328; *idem.*, *A History of the National Tuberculosis Association*, N. Y., 1922, 341-346; H. E. Sigerist, *American Medicine*, N. Y., 1934, 242-244, 285-286; S. R. Kagan, "Dr. William Henry Welch," *Medical Record* (March 16 and April 6) 1936, 267-270, 317-319; *idem.*, *Life and Letters of Fielding H. Garrison*, Boston, 1938, *passim*; L. F. Barker, "William Henry Welch," *Hygeia* (Apr.) 1935; Wm. Osler, "Dr. William H. Welch," *Am. Mag.*, N. Y., 1910, LXX, 456-459; S. Flexner, "Dr. William H. Welch," *Science*, N. Y., 1920, n. s., LII, 417-433; *idem.*, *Science*, 1934, LXXIX, 529-533; H. Rolleston, *Sir Thomas Clifford Allbutt*, London, 1929; *idem.*, "Obituary Notice," *Brit. M. J.* (May 12) 1935; "Dedication of Welch Medical Library," *Bull. Johns Hopkins Hosp.*, 1930, XLVI, 3-122; H. R. Viets, "William Henry Welch," *New England I. Med.*, 1934, CCX, 1033-1034.



PROFESSOR PAUL EHRLICH
(1854-1915)

CHAPTER XII

DR. PAUL EHRLICH

(1854-1915)

The doctor is the flower of our civilization.

— ROBERT LOUIS STEVENSON

The future belongs to those who shall have
done most for suffering humanity.

— LOUIS PASTEUR

Among the great men of science and benefactors of humanity an important place is reserved for Dr. Paul Ehrlich. He was born in Strehlen, Silesia, on March 14, 1854. His parental grandfather lectured for many years on botany and physics. On his mother's side also were men of science, such as Ehrlich's cousin, Carl Weigert, who was an eminent pathologist.

Ehrlich studied medicine at Breslau, Freiburg, Leipzig, and Strassburg, from which latter University he was graduated in the class of 1878. During his studies in Breslau Medical Faculty Ehrlich was influenced by Cohnheim, Weigert and Heidenhain, and later in the University of Strassburg, by Waldeyer. After graduation Ehrlich worked for some time in Cohnheim's Institute for Pathology, and attracted attention with his research work.

In 1883 Ehrlich married Miss Hedwig Pinkus, who made his life comfortable, creating for him an atmosphere of peace and happiness. He had two daughters, Stefanie (Mrs. Schwerin) and Marianne (Mrs. Landau).

POSITIONS AND HONORS

Frerichs first recognized Ehrlich's ability and appointed him in 1878 as assistant in Medical Clinic at Berlin, and gave him an opportunity to make researches freely. When Frerichs died in 1885, Ger-

hard took over the management of the Clinic and interfered with Ehrlich's research work. Frustrated, Ehrlich left the Charité in 1887. Then he became instructor of internal medicine at the University of Berlin. In 1888, through his extensive researches on tubercle bacilli, he became infected with pulmonary tuberculosis. Then he spent one and a half years in Egypt for climatherapy and recovered completely. When he returned home he established a small private laboratory for researches in Berlin.

In 1890 Ehrlich was appointed professor at the University of Berlin. From 1890 to 1895 he had his own laboratory in Koch's Institute for Infectious Diseases. In 1896 Ehrlich became director of the Royal Institute for Serum-research and Serum-testing in Steglitz. Thanks to the efforts of Althoff, he was transferred in 1899 as director of the Royal Institute for Experimental Therapeutics at Frankfort-on-the-Main. When the University in Frankfort-on-the-Main was established, Ehrlich became a member of the faculty. In 1906 Mrs. Franziska Speyer, on the recommendation of her brother-in-law, Prof. L. Dornstädter, established the Georg Speyer-Haus for scientific research in memory of her late husband, a Jewish banker. Ehrlich became director of this institution, where he carried on systematic studies in chemotherapy, and had the opportunity to find a "magic bullet" in the treatment of syphilis. All Ehrlich's work was directed towards humanitarian purposes, the hunting of microbes, and the diagnosis and treatment of infectious diseases. This work places him in the company of the immortals, Pasteur, Lister and Koch. It has been said of Ehrlich that "he opened new roads to the unknown and left the world his debtor."

In recognition of his scientific achievements, Ehrlich was honored by the profession, the government and institutions the world over. He received from the Prussian government the title of professor (1884), the ranks of Geh. Obermedizinalrat (1907) and Wirkl. Geh. Rat (1911), and was the first after Virchow to receive the grand gold medal in science for his contribution to immunity. Honorary professorship from the University of Göttingen and LL.D. degree from the University of Chicago were bestowed upon him in 1904. In 1907 he received an honorary degree of Doctor from Oxford University. The Rockefeller Institute of New York presented \$10,000.00 for research work in Ehrlich's Institute. In 1908 Ehrlich shared with Metchnikoff the Nobel Prize for work on immunology. In 1900 Ehrlich delivered

Croonian Lectures in London. During his last period he gave lectures in Sweden, Denmark and Holland. In 1904 he visited our country and gave a series of lectures in several large Eastern cities. In a letter to Mr. McClure, Ehrlich wrote: "I remember with pleasure my trip to America, and the friendship and mental stimulus that I found there."

MEDICAL CONTRIBUTIONS

The first period of Ehrlich's researches was devoted to studies on dyes. While he was a student in his second year at the University of Strassburg, a publication of Emil Heubel on lead poisoning attracted his attention. Ehrlich carried on his own researches along this line by means of photographs and then by the analine dye, fuchsin (1876). His experiments with dyestuffs demonstrated that various tissues responded in different ways to the same dyestuff, and thereby he laid the groundwork for his theory of staining. Ehrlich asserted that an administrated drug, when digested, is not equally distributed throughout the body, nor does it equally affect the different tissues and organs. His basic idea was that every type of living cell, including bacteria and other parasites, has a specific affinity for some particular substance. He showed that certain drugs taken in the human system will destroy certain pathogenic germs without injuring the body tissue in the midst of which these germs lurk.

Up to Ehrlich's time blood had been studied only microscopically in its fresh state. Ehrlich first investigated dried preparations of blood, using Koch's method for staining bacteria, which consisted of drying in the air a small thinly spread drop of blood on a slide. But later Ehrlich discovered that the cells were colored much more clearly if the slides were heated, because the heat fixes and hardens them. When Koch discovered the bacillus tuberculosis it was difficult to see it on the slide. Ehrlich disclosed the acid fast nature of tubercle bacilli and in 1882 introduced the staining technic for them by using aniline dye and acid discoloration.¹ By using his technic, Ehrlich was able to demonstrate clearly Koch's bacillus under the microscope.

1) See K. Faber: *Nosography in Modern Internal Medicine*, New York, 1923, 112-113.

To Ehrlich we are indebted for the simple method of recognizing tubercle bacilli when mixed with other bacteria.²

Ehrlich's staining technic created a new basis for chemico-biologic analysis of tissue. He made possible the establishment of cytology, a special branch of biology. He discovered the mastzellen as their granules have an affinity to basic dyes. In recognition of this discovery Ehrlich became chief physician at the Koenigliche Charité in Berlin. His further experiments showed that different parts of the white blood corpuscles have a predilection for different substances. Ehrlich in 1882 succeeded in perfecting a staining solution consisting of three different dyes, now known as "Ehrlich's triacid stain," with which he differentiated the normal leukocytes by their individual staining reactions into five distinct types. He classified the leukocytes according to the presence or absence of granules, described polychromatophilia, differentiated the leukemias, distinguished between normoblasts and megaloblasts, lymphoid and myeloid tissue. He laid the foundation for the study of the specific reactions of cells to stimuli and various reactions and showed that leukocytosis is a function of bone marrow.

Dr. Ehrlich first described and named eosinophiles, neutrophiles, basophiles and acidophiles (1880), and introduced intravital (methylene blue) stain for nerve substance (1886). By using this vital stain, he discovered new data concerning the end of the nerves and the minute anatomy of the ganglion cells. Ehrlich's discovery that methylene blue has an elective affinity for nerve endings served as the starting point for neurologic researches. With his method of staining, the study of the normal histology and morphology of the blood and the spongy tissue was advanced. In fact, important discoveries of the blood and lymph started with Ehrlich's dyes. Our present knowledge of hematology developed as a result of Ehrlich's achievement in the technic of staining. Of no less importance is the value of Ehrlich's staining technic in the fields of bacteriology and pathology, particularly in blood diseases such as leukemia and anemia. This period of Ehrlich's work is designated as the epochal study of dyes.

In 1896 Friedrich Althoff recognized the potential power of Ehrlich as a scientific investigator and appointed him to the newly estab-

2) M. Marks: "Paul Ehrlich: The Man and His Work," *McClure's Magazine* (Dec.) 1910, 63:2, 186.

lished *Institut für Serumprüfung und Serumforschung* in Steglitz, near Berlin. Here Ehrlich started his experiments in immunology which constituted his second period of researches.

As is known, Behring discovered the diphtheria antitoxin, but Ehrlich contributed greatly to the practical application and establishment of the standardization of it. Ehrlich first stated that antitoxin is effective also against plant poisoning. In order to perform experiments with antitoxins, he used freely the plant toxins — ricin, abrin and robin — which are subject to the same rules of immunization produced by bacteria toxins. This method proved to be of great significance.

Ehrlich found a method for the production of a serum of high antitoxic power by performing systematic repeated injections of the toxin into the horse. He also was able to ascertain the degree of the acquired immunity. He discovered the rhythmical action of toxins; thereby he laid the foundation for the practical technic of immunization. On this principle is based the vaccine therapeutics introduced later by Wright. Ehrlich proved that mother's immunity is transmittable to her youngster by breast nursing, as the milk contains her antitoxin factors. Ehrlich established a standard for antitoxin which the German government adopted under its supervision, and since then this standard has been accepted almost everywhere. Dr. Milton J. Rosenau recognized the significance of Ehrlich's standardization, and introduced it in our country in 1906.³ In 1904 Ehrlich's book, *Collected Studies on Immunity*, was published. This and his other works made him one of the greatest authorities on immunology.

In 1885 Ehrlich presented in his work, *Das Sauerstoffbedürfniss des Organisms*, a new idea of the properties of the protoplasm, which laid the ground for his "side-chain theory." According to Ehrlich, every cell of the body possesses a number of "receptors" whose normal function is to receive and admit into the cells the food they need for maintenance. When those receptors come in contact with toxins, they are destroyed together with part of the cell, but new receptors are produced in even greater numbers than those destroyed.

3) Dr. Rosenau acknowledged the debt which mankind owes to Ehrlich for his devised standard of antidiphtheria toxin. See M. J. Rosenau: "The Immunity Unit for Standardizing Diphtheria Anti-Toxin (Based on Ehrlich's Normal Serum)," *Bull. No. 21, Hygien. Lab., Wash., D. C.*

When a second quantity of toxin enters the body, it again combines with these receptors, causing a still further production. Through the excessive production, the receptors are pushed off from the cells and float free in the body fluids, principally in the blood. Now when toxins are entering the body they are caught by these free floating receptors, which are ultimately destroyed and eliminated by the various excretory organs. The organism thus becomes immune to that particular poison. After numerous experiments on mice, he concluded that it is possible to immunize the bodies of animals against certain poisons, if these poisons are given in small, gradually increasing doses. Ehrlich's side-chain theory was an important contribution to immunology. Thus, Wassermann stated that he would never have discovered his hemolytic reaction for the serodiagnosis of syphilis without Ehrlich's theory.

In 1899 Ehrlich was appointed to the *Königliche Institut für experimentelle Therapie*, where he started studies of hemolysin, the third period of his work.

Ehrlich's fourth and last period of scientific work was the establishment of experimental chemotherapy which brought him a triumph.

When the sleeping sickness, trypanosomiasis, spread in Africa, Ehrlich made extensive experiments in this field. Finally he found a seemingly specific drug, which he called arseno-phenyl-glycin, as a potent remedy in the combat of this disease. He introduced methylene blue for quartan fever, trypan red for bovine piroplasmiasis and arseno-phenylglycin for the trypanosomiasis.

Encouraged with this success, Ehrlich turned his attention to another similar parasitic disease, syphilis. After many years of experimenting, he was successful in using his preparation 606, which he named dioxy-diamido-arseno-benzol (salvarsan). It killed the spirochaeta pallida without injuring the host. Osler writes that "the man whose ideas revolutionized modern pathology, Paul Ehrlich, is a Jew."⁴ Dr. Herman Goodman remarks: "The hope to rid civilized man from syphilization relies on salvarsan — the product of a German Jew."⁵

4) Wm. Osler: "Israel and Medicine," *Menorah Jour.*, New York (June) 1915, I, 148.

5) H. Goodman: "William Henry Perkins and Paul Ehrlich," *Med. Record* (Apr. 3) 1940, 244.

In 1913, at the International Medical Congress held in London, Ehrlich read a paper on chemotherapy and predicted that further research would prove that the application of chemical compounds by intravenous injection would cure many infectious diseases. This idea laid the foundation for investigations in this direction the world over. In our country, Dr. Hugh Young was one of the pioneers who established a laboratory for chemical investigation at the Brady Urological Institute of Johns Hopkins Hospital. He, Dr. H. A. B. Dunning, Dr. J. H. Hill, Dr. E. C. White, Dr. E. Davis, and Dr. E. O. Swartz used various compounds of phenolsulphonephthalein and mercurochrome, and advanced the knowledge of chemotherapy.⁶ Drs. R. Penick, O. S. Culp, E. B. Piper, and J. L. Emmett of the Mayo Clinic also made extensive researches along Ehrlich's principles in chemotherapy.

Ehrlich was a man of moderate means, but he did not want any financial profit from his invention.⁷ He tried his best to make accessible this remedy to all, regardless of financial standing. When he learned of the high prices charged for his salvarsan, he was very much dissatisfied. Ehrlich intended to postpone the commercial application of this new preparation until further observations would show its indications and contra-indications. However, under the strong pressure of many physicians and because of sympathy with the patients, he allowed it to be placed in the market. In the early use of 606 some patients died. A complaint of administering a dangerous remedy was brought against him, but the court upheld Ehrlich.

Ehrlich also made studies on other medical and chemical subjects. In 1902 he made experiments in the field of malignancy. He pointed out that carcinoma may show all the characteristics of sarcoma. He formulated a theory which is known as that of atreptic immunity. He developed a method to demonstrate the manner in which snake

6) See H. Young: *A Surgeon's Autobiography*, 1940, New York, Harcourt, Brace & Co., 252-263.

7) It is of interest to note that the American Doctors, F. I. Schamberg, G. W. Raiziss and I. A. Kolmer, of Philadelphia, followed Ehrlich's principle of altruism. During the World War they developed a process for elaboration in this country of salvarsan to supply the U. S. Army and Navy Hospitals with the drug. Dr. Schamberg donated the profits from this drug to an endowment for the Research Institute of Cutaneous Medicine in Philadelphia. See S. R. Kagan, *Jewish Contributions to Medicine in America*, Boston, 1939, 195-196.

venom affects blood, described hemolysis and discovered isolysin. Ehrlich's diazo reaction is of diagnostic value in typhoid fever and measles, and also of prognostic value in tuberculosis. The reaction consists of a pink or red color developing from the action of diazobenzenesulphonic acid and ammonia on certain aromatic substances contained in urine under certain conditions. Ehrlich discovered aplastic anemia (Ehrlich's anemia) and described a test for bile.

Ehrlich coined remarkable expressions in his scientific work which were accepted the world over. Among them are: "Gonokokken," "Mastzellen," "Myelozyten," "aplastische Anämie," "Diskoplasma," "atreptische Immunität," "active and passive Immunität," the nomenclature of the chain side theory: "Rezeptoren," "Chemozeptoren," "Komplemente," etc. Ehrlich's dictums: "Therapia sterilisans magna," and "Corpora non agunt, nisi fixata" expressed his idea of the purpose of chemotherapy and his work.

Ehrlich was author of eleven books and monographs, 212 articles, and co-editor of an *Encyclopedia of Microscopic Technic*. Three hundred ninety-nine publications were compiled in the Institutes under his supervision.

PERSONAL TRAITS

Ehrlich was a typical man of science with high ideals and confidence in his intellectual powers as well as in the future of science. He possessed originality and extraordinary breadth of vision and imagination. He worked in the laboratory with complete devotion and love.

Scientific advancement was his purpose in life. He was an untiring worker who was inspired both by his love of research work and by his merciful feelings for the poor and sick. It was characteristic of Ehrlich to be perfectly oblivious to personal interest and health when engaged in research work or in the treatment of the sick. In his war against microbes, his imagination, his confidence and his zeal paved the way to triumph.

When Ehrlich discovered salvarsan it became known throughout the world, and men of science, laymen, and members of royal families expressed their gratitude. An audience was arranged with the German Emperor, Wilhelm II, who expressed appreciation for his useful work. It is recorded that the Emperor, who was worried about a cancer heredity in his family tree, asked him to find a specific cure for cancer,

too. Ehrlich had previously done research in this field and it was too early to expect a cure for this dreaded disease whose etiology is unknown. As a man of science, he did not give the Emperor encouragement or hope for an early success. The Emperor then became angry and abruptly terminated the audience.

Ehrlich was gifted with a quick and deep perception, and believed in absolute concentration along one line. He said of himself that his most significant asset was his "chemical imagination." He used to say that achievement in scientific work depends upon four capital "G's" [in German all nouns start with a capital letter] : Geld (money), Geduld (patience), Geschick (cleverness) and Glück (luck). He was modest and kind, but fought vigorously with his opponents. His publications are remarkable not only for their sound logic but also for their clarity and mathematical accuracy.

Ehrlich was not interested in classical music or poetry. As a recreation he liked sometimes to read stories of detective life, particularly by American authors. He liked to smoke expensive cigars and collect scientific reprints and journals.

Dr. Emil Amberg, of Detroit, communicated to me his recollections of Professor Ehrlich's visit to Detroit March 24, 1904. Parke, Davis & Company arranged a dinner at the Detroit Club in recognition of Ehrlich's services concerning diphtheria antitoxin. The most delicious food and the choicest wines added to the enjoyment of the illustrious guest. At the dinner, Ehrlich wanted to drink the tomato sauce in the center of the oyster plate, but Dr. Amberg explained to him that the sauce was not to be drunk and that it was served to be used with the oysters. Ehrlich answered modestly every toast individually, immediately after delivery. Some time later Professor W. H. Welch told Professor V. C. Vaughan that Ehrlich was enthusiastic about his Detroit visit.

Ehrlich was an altruist uninterested in problems outside of medicine, such as politics and amusements. He was not connected with Jewish philanthropic or scientific institutions. A Russian-Hebrew correspondent representing the Hebrew journal *Hameliz* once interviewed him. Ehrlich was pleased to learn of the progress of Hebrew literature, but emphasized that science is international, and he, as a man of science, devoted his time and energy exclusively to science and humanity. When Ehrlich elected his collaborators and associates in his scientific laboratory, he never made a discrimination of nation-

ality or race, but was guided by their ability to do scientific research. When Dr. Chaim Weizmann decided to build a Hebrew University in Palestine, he tried to get the assistance of Ehrlich. Professor Leopold Landau arranged a meeting with Ehrlich for Weizmann, who was able to prove the usefulness of his plan, and secured Ehrlich's promise to help. In May 1914, a university committee was appointed, composed of Baron James Rothschild, Ehrlich, Professor Wormser, Professor Otto Warburg, and Dr. Weizmann. Unfortunately, the World War broke out, and the work of this committee was suspended. However, the groundwork laid by this Zionist committee, of which Ehrlich was an honorary member, brought forth fruit later, and the Hebrew University was erected on Mount Scopus, where the greatest Jewish scholars are today advancing science.

In 1914, during the last World War, Ehrlich was one of the many German scientists to resign from honorary membership in British scientific societies. As a devoted son to his country, he signed a proclamation confirming the fact that Germany did not start the World War.

TRIBUTES TO PAUL EHRLICH

Ehrlich became known throughout the world as a master mind and pioneer in medicine. In 1914 a Festschrift, *Paul Ehrlich, Eine Darstellung Seines Wissenschaftlichen Wirkens*, was edited by thirty-seven men of science of various countries, his pupils, associates and friends, on the occasion of his sixtieth birthday. This voluminous work presents a comprehensive description and evaluation of Ehrlich's achievements during the years between 1877 and 1914, by the greatest authorities of his time. A few tributes to Ehrlich which are included in this book are given herewith.

Professor Waldeyer, Ehrlich's teacher, wrote that Ehrlich's experiments were not performed blindly, but conducted on strict mathematical and chemical principles. This is evidenced from all his work in the field of biology. Although dyed tissue elements were used long before by G. Gerlach, Ehrlich's accomplishment was that he brought the analytical investigations by dyeing to an exact scientific method, and of particular importance is his dyeing of the cerebro-spinal nervous system.

Professor Koch said in 1883 that with the help of Ehrlich's dyeing processes it was much easier to diagnose the tubercle bacillus.

Dr. H. Ritz stated that Ehrlich's studies of the plant toxins were the groundstone for the explanation of the immunity processes and for further development of that branch of science. According to Dr. Th. Madsen, we owe to Ehrlich's genius the quantitative concept of immunity and the knowledge of the principle of increasing immunity.

Dr. A. C. Hof remarked that Ehrlich contributed many important new ideas to the science of botany. Professor Gaffky asserted that undoubtedly Ehrlich's work will bring in the future many valuable fruits, that his original thoughts will serve as the seeds and ground for many years for scientific and practical work in the field of immunity.⁸

Dr. F. H. Garrison wrote: "In his skill in improvising hypotheses to meet the opponents of his theories, Ehrlich resembled Galen. In his predilection for quaint and archaic Latin phrases, he was like Paracelsus. But he has done the most effective work since Pasteur and Koch in the science of infectious diseases, and he has added new territory to the domain of experimental pharmacology and therapeutics by his genius for research and his wonderful industry."⁹

Dr. Christian Herter, professor of pharmacology at Columbia University, said in an address: "Claude Bernard, Helmholtz, Pasteur and Ehrlich, are the unexcelled prototypes of investigators of life phenomena in medicine, — at the time when Pasteur was beginning his research on anthrax, a young student at the University of Strassburg, Paul Ehrlich, was laying the foundation for that uniquely fertile and versatile career of medical research which has made him the most original and picturesque of living investigators of medical science."

Sir Humphry Rolleston said that "the knowledge of diseases of the blood-forming organs and the morphology of the blood corpuscles has advanced enormously, largely as the result of Ehrlich's introduction of special staining methods."¹⁰

Emil Behring in his eulogy of Paul Ehrlich said: "Du hast Schule gemacht wie kaum einer vor dir und bist zum Magister mundi in der medizinischen Wissenschaft geworden!"¹¹

8) Festschrift: *Paul Ehrlich*, Jena, Gustav Fischer, 1914, 126, 133, 193, 208.

9) F. H. Garrison: *History of Medicine*, Phila., 1922, 748.

10) H. Rolleston: *British Med. Jour.*, July 23, 1932.

11) The translation of this sentence is as follows: "You created a school, almost without equal, and you became the master of the world in medical science." See A. Lazarus, *Paul Ehrlich*, Vienna, 1922, 80-81.

Ehrlich was a dominant figure in the world of science of his time. He revolutionized six branches of medical science. His achievements were of a turning-point nature, and formed bases for further investigations and advancement of medical sciences. Ehrlich through his teaching and writing exercised a profound influence upon the medical thought of his time.¹²

During his forty active years in medical research Ehrlich worked tirelessly, assiduously, with great scientific integrity. He applied his extraordinary talent for medico-chemical investigations to many important medical problems culminating in his discovery of salvarsan. His original theories, principles, suggestions and technic were of great value to botany, biology, histology, immunology, bacteriology, pathology, chemistry, biochemistry and chemotherapy. His work served as a basis, a stepping-stone to many discoveries. Ehrlich paved the way for numerous research workers and supplied them with raw material and methods for investigations. Many scientific researches were carried out by his pupils and associates under his supervision and advice. In this way he founded "Ehrlich's school."

Ehrlich died in Hamburg on the 20th of August, 1915, at the age of sixty-one, while still engaged in his scientific work. It was a fitting close to a life of substantial accomplishments and devotion to science and altruistic purposes. He loved the world, and the world loved him. His name went down in history as a benefactor of humanity.

The most important work on Ehrlich's biography and achievements is the *Festschrift: Paul Ehrlich*, Jena, Gustav Fischer publ., 1914, which contains also a complete bibliography of Ehrlich's writings. Other biographical sources are: I. Fischer, *Biog. Lexikon*, Berlin and Vienna, 1932, I, 352-354; A. Lazarus, *Paul Ehrlich*, Rikola Verlag, Vienna, 1922; A. Mansch, *Medical World*, Berlin and Charlottenburg, III; M. Marks, "Paul Ehrlich: the Man and His Work," *McClure's Magaz.*, N. Y. (Dec.) 1910, XXXVI, 184-200; P. de Kruif, *Microbe Hunters*, N. Y., 1926; F. H. Garrison, *History of Medicine*, Phila., 1922; *idem.*, "Ehrlich Specific Therapeutics in Relation to Scientific Method," *Pop. Sc. Monthly*, 1911, LXXXIII, 209-222; M. S. Jacobs, "Paul Ehrlich and His Relation to Modern Chemotherapy," *Bull. Hist. Med.* (July) 1940, VIII, 956-964.

12) One of Ehrlich's pupils, Prof. Gerhard Domagk, discovered prontosil by using his teacher's method, and was awarded the Nobel Prize for this scientific work in 1939. See *Manchester Guardian Weekly*, London (Dec. 5) 1939.

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